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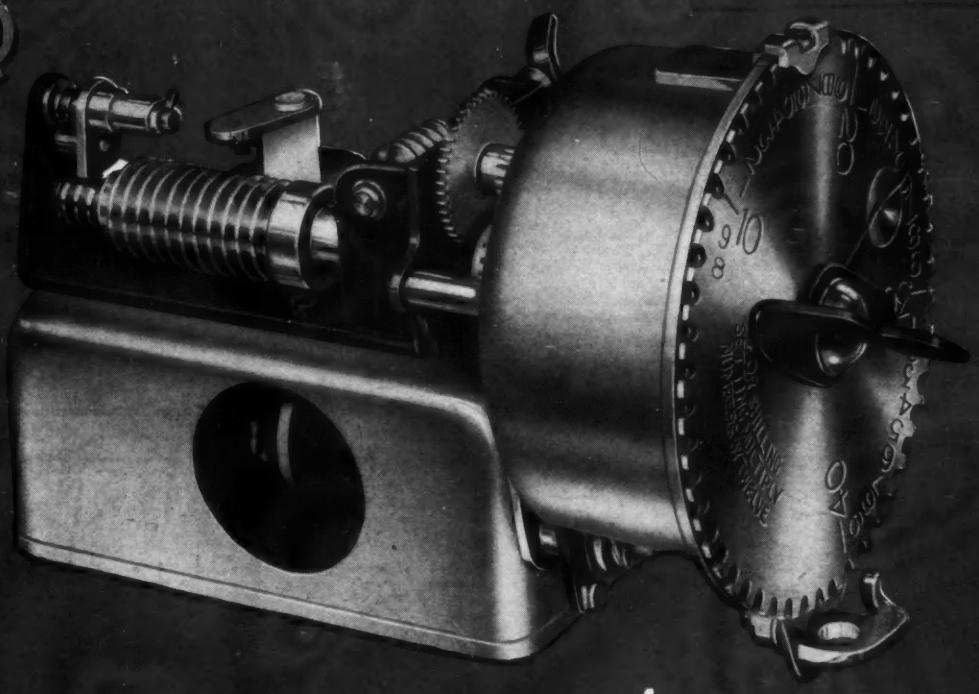

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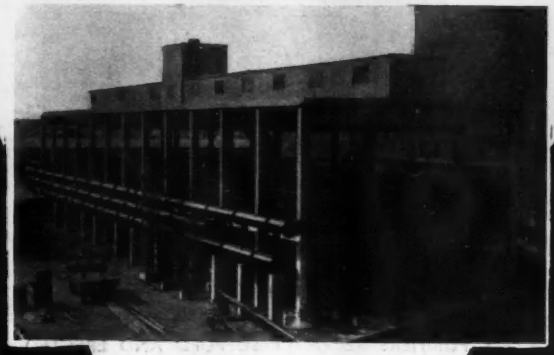

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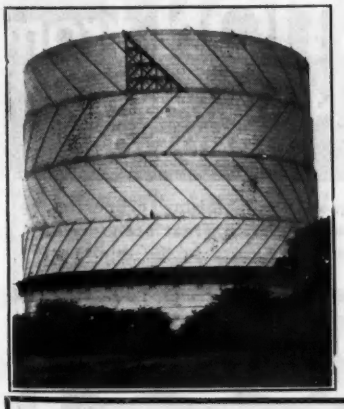

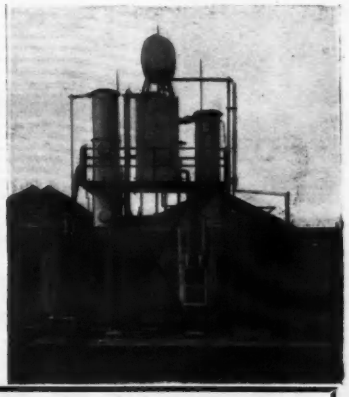

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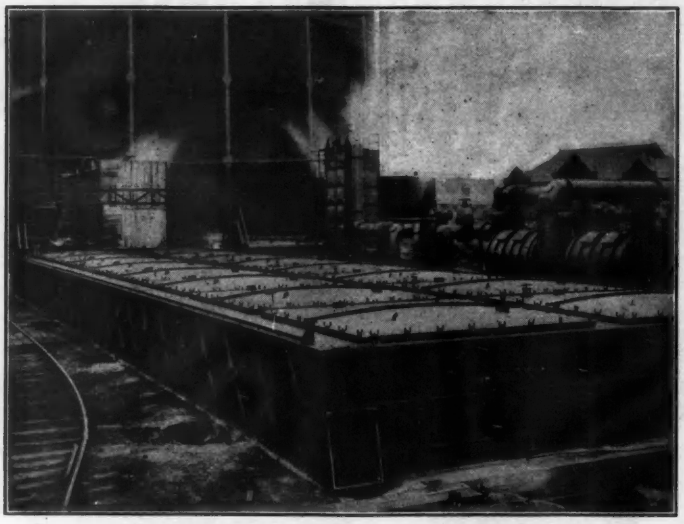

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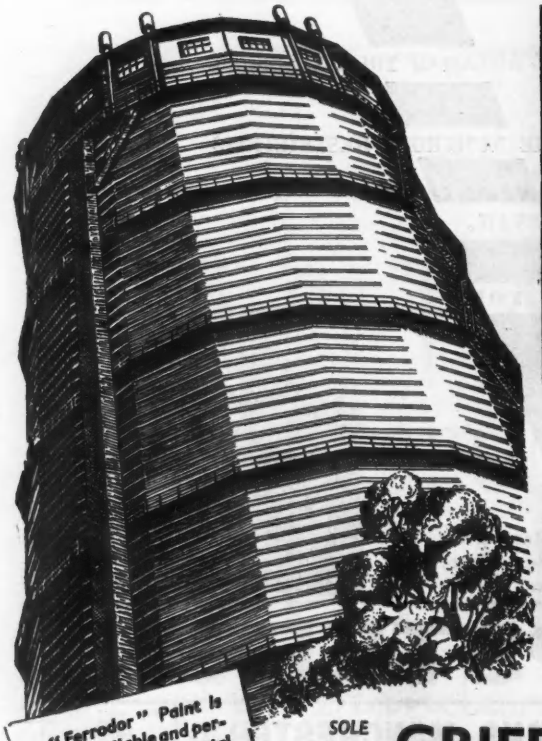

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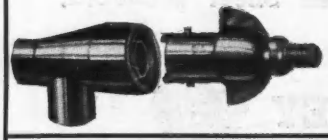

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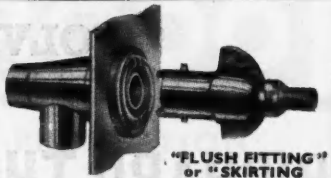

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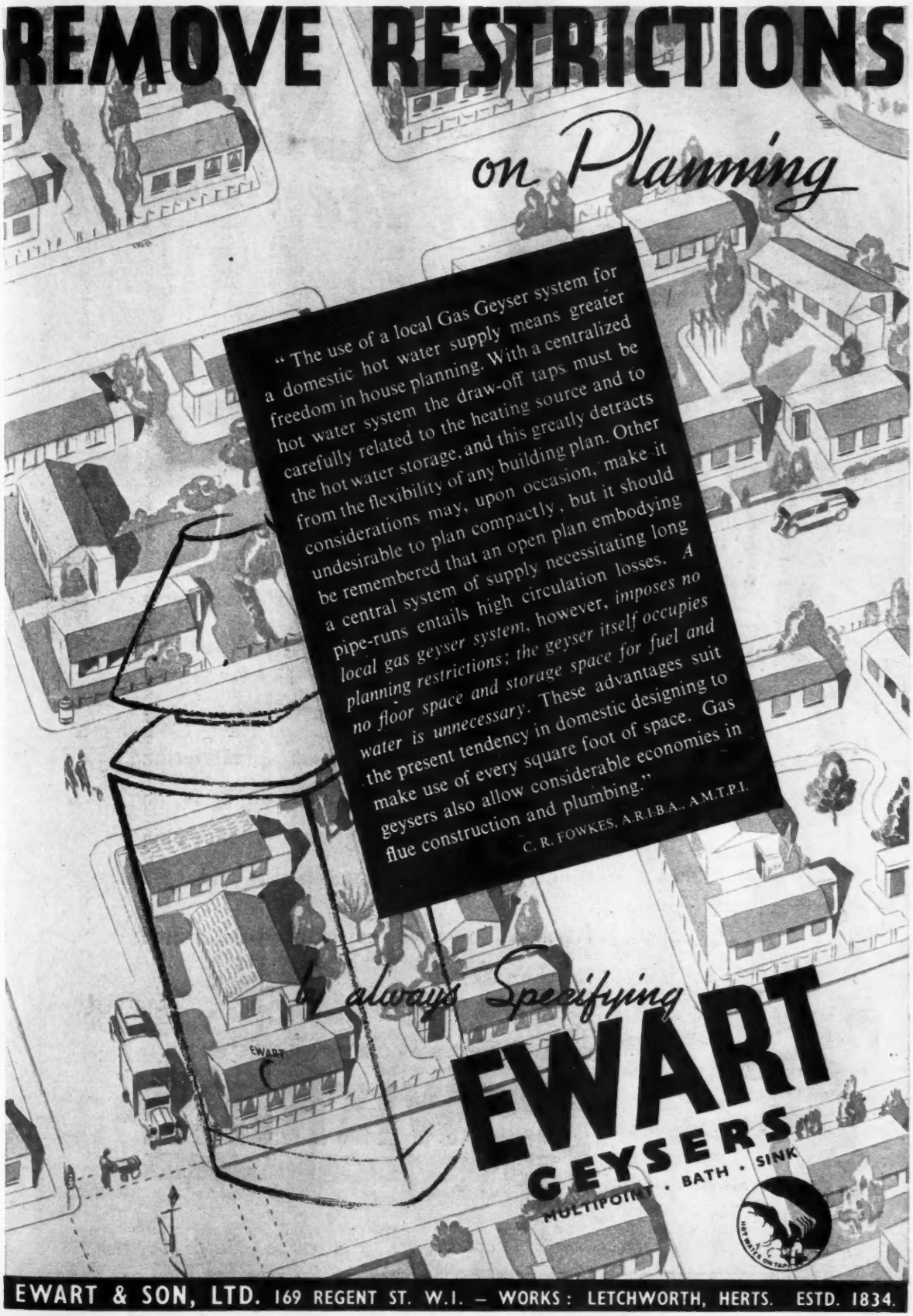

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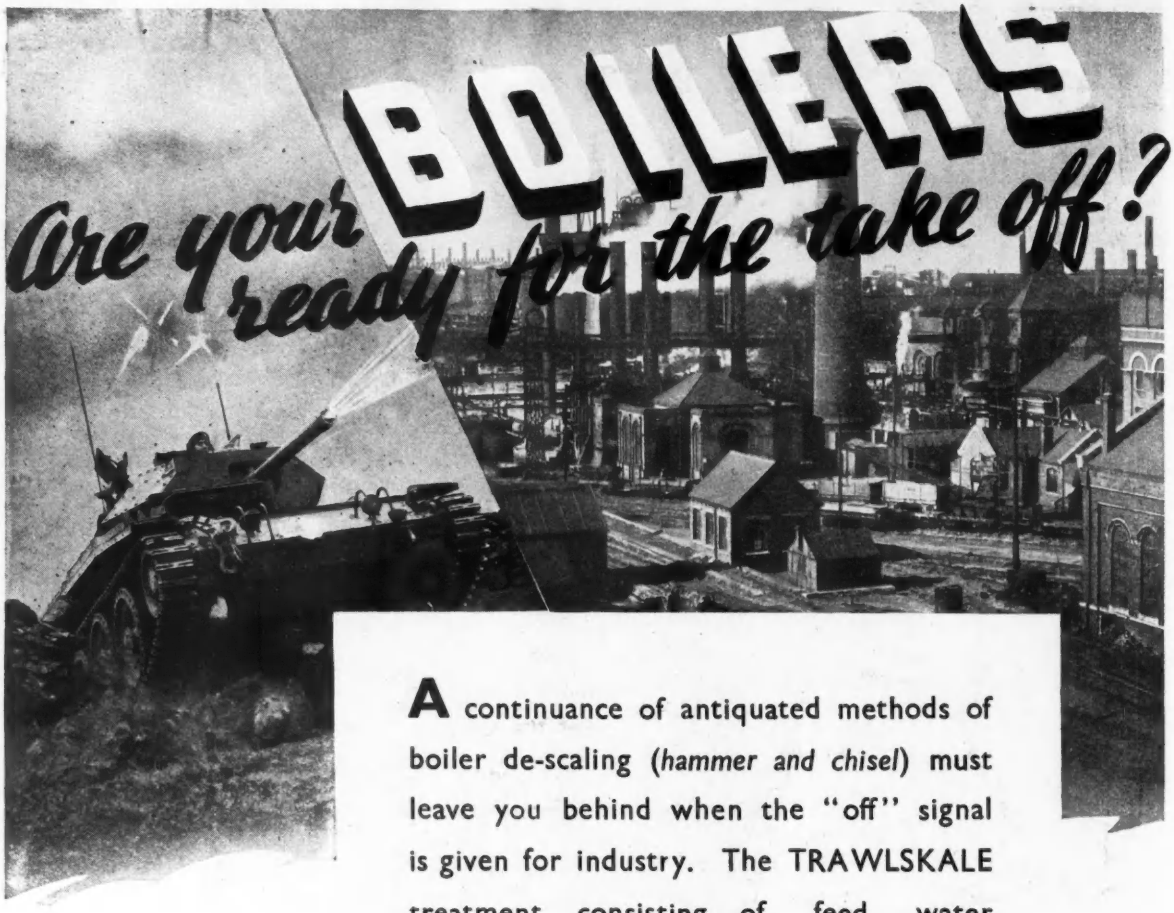

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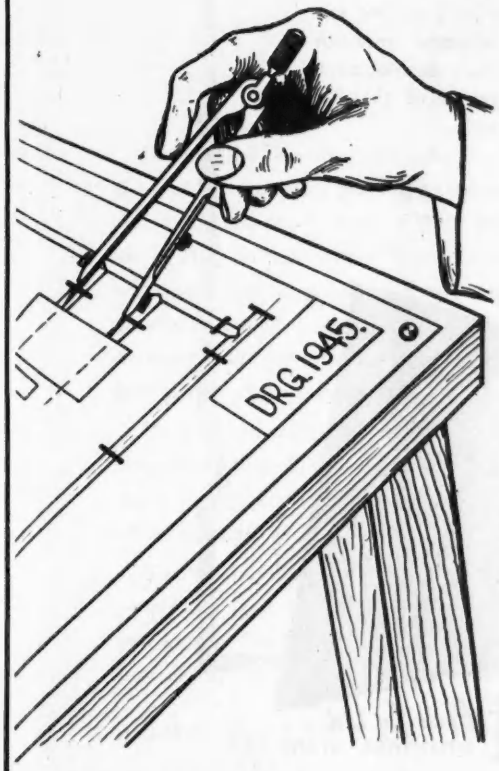

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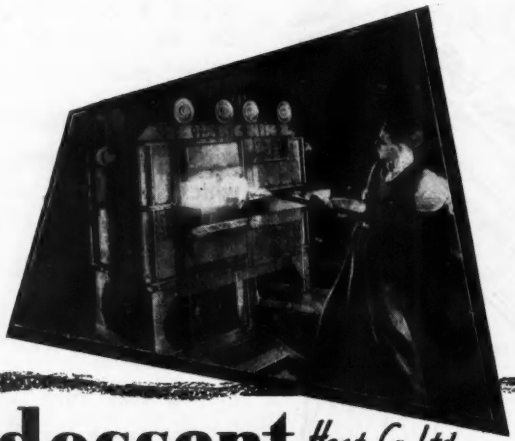

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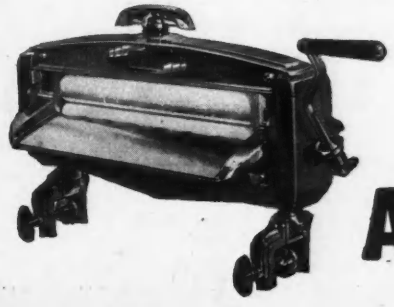

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There may still be sources of gas economy which haven't been thoroughly investigated. To be quite certain about this the best thing to do is to go carefully through the suggestions listed in the two Bulletins below. Examine afresh each economy item to see if it is being followed at your plant to the fullest extent possible.

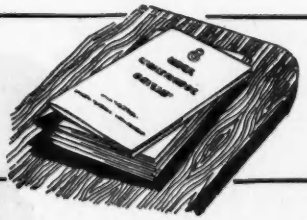
PRACTICAL ECONOMY POINTS FOR INDUSTRIAL GAS USERS
(Bulletin No. 5)

This Bulletin gives two lists of sound and easily followed hints on gas economy : one list is for management, and the other for operators. Planned production coupled with a keen fuel-watching system can produce considerable savings.

OPERATION AND MAINTENANCE OF GAS BURNERS
(Bulletin No. 14)

Every operator of a gas-burning appliance should read and re-read the hints in this Bulletin. Unless he understands the burner and its controls, he may be not only wasting gas and getting bad results, but giving himself a lot of needless trouble into the bargain.

If the recommendations in the Fuel Efficiency Bulletins are followed closely the expectation of gas economies can be based not on hope but on *certainty*. If you need extra copies for your executives or your fuel watchers or your operatives, please write or phone your Regional Office of the Ministry of Fuel and Power.



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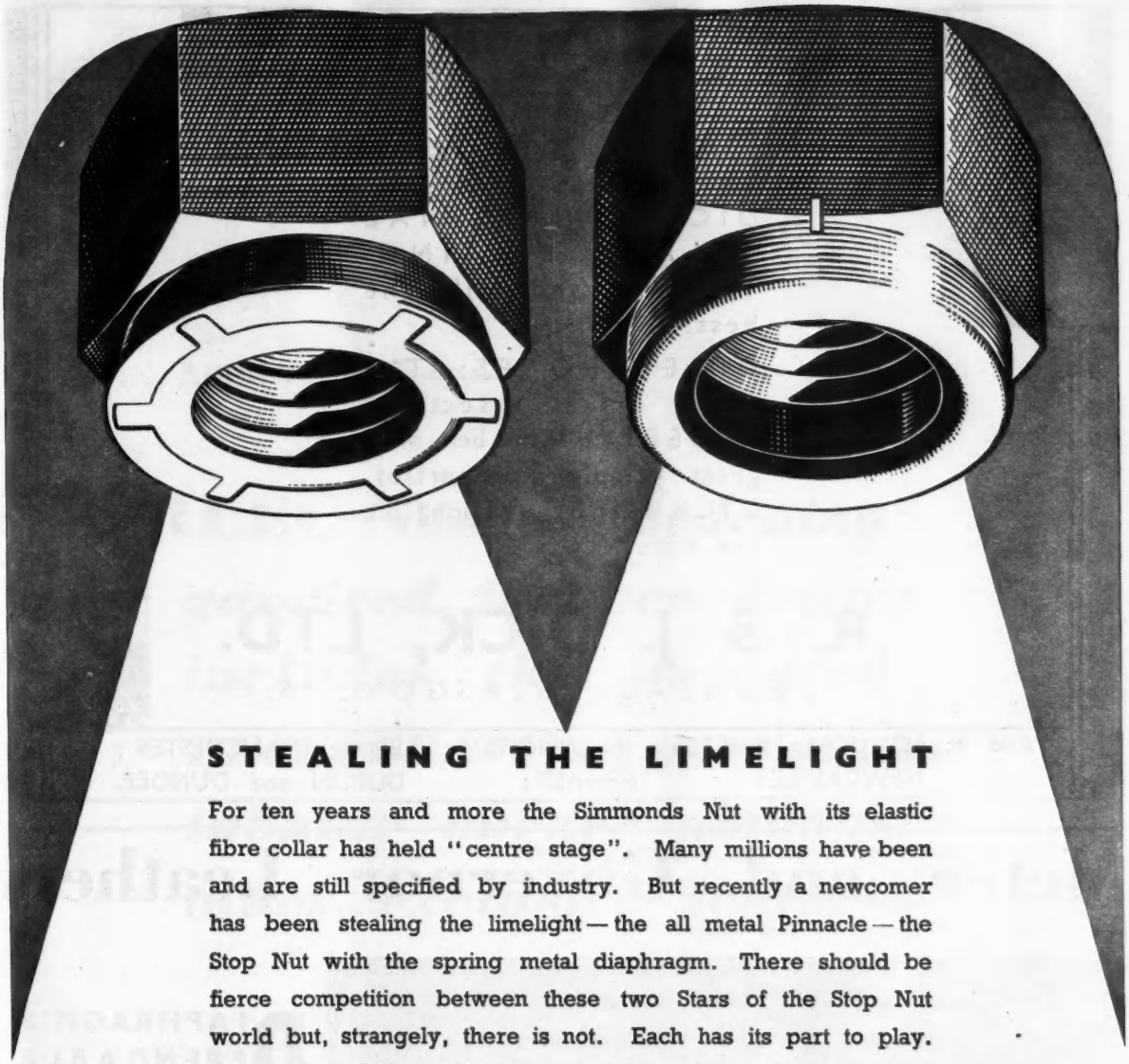

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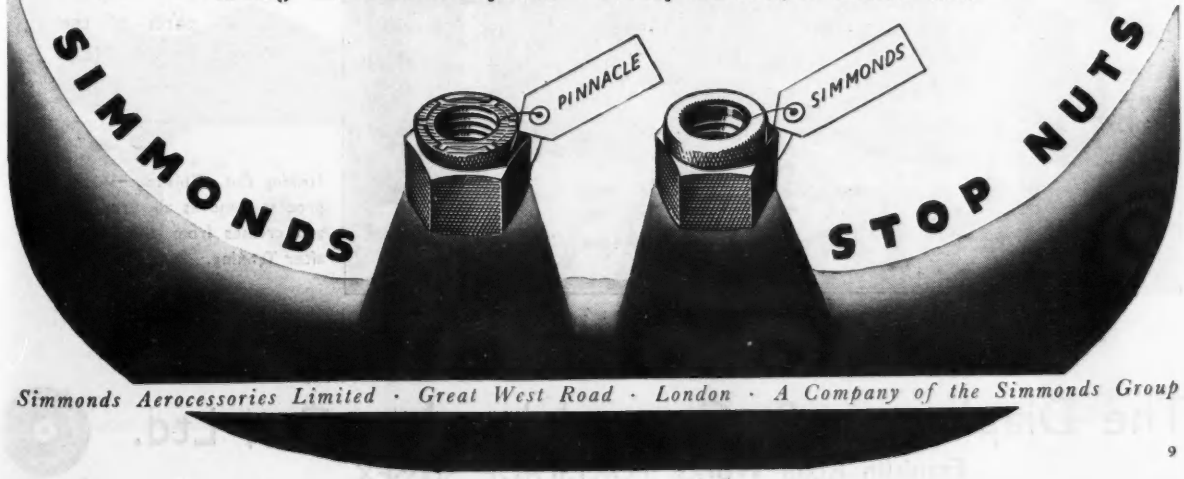

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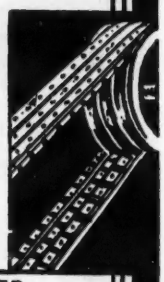

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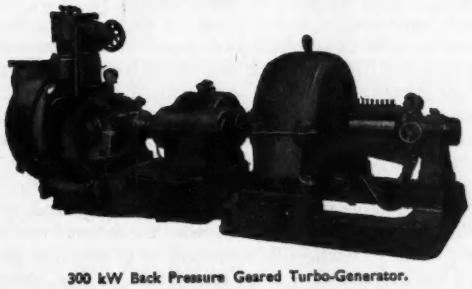

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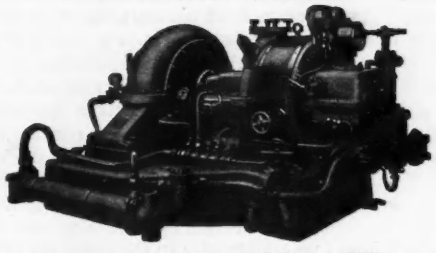

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GAS JOURNAL, AUG. 1, 1945

VOL. 246 97th YEAR No. 4289

EDITORIAL NOTES

WHEN DOCTORS DISAGREE

OUR comments under the heading "A Disgraceful Waste" in the "JOURNAL" of July 11—words taken from a Paper by Mr. T. B. Smith, published in the same issue—have led to a distinct disagreement of views between the Author and ourselves. This will be evident enough from a perusal of our correspondence columns. There is, fundamentally, of course, common ground between Mr. Smith and ourselves. We are both concerned to utilize our dwindling coal reserves in the most effective way. We are both concerned to provide the consumer with what he (or she) wants. We agree also with much in the Author's presentation of the physical and chemical reactions in the coke oven. The formation of the plastic layer, the probable subdivision of flow, the thermal decomposition of oil into lighter oils, gas, and (if the temperature is sufficiently high and the time of contact sufficiently long) into carbon and hydrogen, are examples.

But with so many points of accord, there is still a large and important measure of disagreement between us, and we would stress that the problem should be regarded objectively and not subjectively. The personal element is out of place in the assessment of facts and the search for what may prove truth. If Mr. Smith is right, it would appear that the whole basis of carbonization is due for change. If he is wrong, we may still find better ways of utilizing coal, but at least we shall know that one particular direction is not that in which we should travel.

We have been taken to task for calling in question Mr. Smith's statement that "carbonization as generally practised is most unscientific in its principles, and a disgraceful waste of . . . our natural resources." The basis of Mr. Smith's allegation is that in his view it should be possible to secure by carbonization a yield of oils of some 80 gallons a ton with the residue in the form of a reactive coke, but that instead of doing so, we produce coke and gas together with some 8 to 20 gallons of oil and tar according to the process used. The Coke Oven Industry, in which Mr. Smith has spent most of his working life, owed its origin to, and is still largely concerned in, the production of metallurgical coke. As technical progress developed, the by-product coke oven superseded the bee-hive, and the steelworks found that coke oven gas was essential to them for heating furnaces. By-product coking is thus for the most part an ancillary process in the manufacture of steel. We do not think the iron and steel industry would favour a coke such as Mr. Smith claims to be able to produce, nor do we think that they would look kindly on the replacement of gas by oil. The carbonization process contributes very materially to the reduction of fuel used, and of costs, in the manufacture of steel, and Mr. Smith's strictures must be rejected in their application to that section of the carbonizing industry. Similarly, the Gas Industry exists to provide the consumer with gas, and with coke. The consumer wants gas. We should like to provide him also with the reactive coke of which Mr. Smith speaks, and a great deal of the research that he condemns is directed to that end through the dual methods of improving the coke-burning appliances and improving the coke. Dr. E. V. Evans (*J. Roy. Soc. Arts*, **86**, 530) has shown that less coal is needed to supply heat for domestic purposes if the coal is first carbonized and the coke and gas are used separately than when raw coal is burnt for the purpose. Is this waste? Dr. Evans' figures are conservative; the latest coke-burning appliances do much better than the figures then at his disposal suggested.

Whether the present research into the production of hydrocarbons from coal will lead to commercial processes or not we cannot yet say, but there is a distinction between the researches of the Gas Research Board and those of Mr. Smith. As we see it, the objective before Mr. Smith is the production of low-temperature tar oils, which are not suitable material for gas enrichment. The G.R.B. objective is the production of methane, which is a very suitable enriching agent.

We should not doubt that if Mr. Smith's process is as successful as he conceives it to be there is a place for it within the carbonizing industry. That place would be in concerns independent of the manufacture of town gas or of metallurgical coke, producing coke for the domestic market and oil as a by-product. (Will raw coal, coke, or oil be then burned to heat the retorts?) Researches have shown that low-temperature tar can be satisfactorily worked up into a number of products of commercial value. That fact reinforces Mr. Smith's claim to a place in the sun for his process. There are thus certain methods of development open to him. But surely it is not necessary, in order to secure such methods of development, to pillory the Gas Industry and the Coke Oven Industry as unscientific wasters of coal.

We shall look forward with interest to seeing whether this process on the works scale produces the yields of oil that Mr. Smith anticipates. It is for him to show in this way that the practical yield of oil from carbonization can materially exceed the figure of 25 gallons per ton which has hitherto appeared to be the practical maximum with normal bituminous coal, and a little above the common works yield by low-temperature carbonization. We do not propose to enter into a technical and scientific argument as to whether the volatile matter evolved above, say, 600°C., is derived from oil or from the decomposition of solid compounds. But it may be remarked that others besides Mr. T. B. Smith have made "a continual and specialized study of the mechanism of carbonization," and that their opinion does not agree with that of Mr. Smith. If Mr. Smith has any valid proof that all the hydrogen evolved during carbonization is derived from oil and can be recovered for sale in the form of oil, we feel that the scientific world would desire to have it.

There is every room for argument in regard to the questions at issue, and, as we stated originally, the only purpose of our comments is to elucidate the true facts. We would suggest, however, in the light of the manner in which Mr. Smith in his letter objects to our criticism, that because his opinion is at variance with that of most of the rest of the carbonizing industry, this constitutes no reason for assuming that his view is necessarily the right one.

Personal

After 20 years' service with Edinburgh Corporation Gas Department, the retirement is announced, on health grounds, of Mr. ALEXANDER B. MUNRO, Sales Superintendent. Mr. Munro was with Glasgow Corporation for 17 years and at Burnley for 3 years prior to going to Edinburgh. He helped largely with public health exhibitions in Edinburgh before the war.

* * *

Mr. A. ROBINSON has been forced by ill health to resign from the active management of the Washer Department of Messrs. Simon-Carves, Ltd., but will remain on the Board in a consultative capacity. A new department is being formed, the Coke Oven and Washer Department, which will combine the old coke oven and washer departments, with the exception of the concrete section of the latter, which is being made into a separate Building Department, under Mr. G. P. BRIDGES, for sub-contracting to the other main departments. Mr. D. T. BARRITT is the Director in charge of the new Coke Oven and Washer Department, with Mr. MEREDITH and Mr. KENNETH MACGREGOR as Chief Engineers of the Washer and Coke Oven Sections respectively.

Letters to the Editor

"A Disgraceful Waste?"

DEAR SIR,—It was interesting to read in your Editorial, "A Disgraceful Waste?," in the "JOURNAL" of July 11 that my Paper before the Manchester and District Junior Gas Association had caused you to rub your eyes and to wonder if you had been dreaming, since it was my deliberate intention to give a jolt to the Carbonizing Industry, of which the Gas Industry forms only a part, and endeavour to dispel the self-satisfied attitude of mind as to the technical efficiency of present-day methods of carbonization. The Editorial itself is full of this self-satisfaction which has such a drugging effect upon progress.

In an Editorial in your issue of Jan. 17 you deny that the Gas Industry is too conservative, stress the necessity to encourage technical advancement, ask those you call technical revolutionaries to have patience, and appeal to the Industry to have faith and vision, stating that the well-being of the Industry will depend upon the extent to which technical capacity is encouraged and utilized. All this would now appear to be so much cant, but I am rather inclined to think I have trodden on a corn that won't stand the pressure without provoking a scream of ill-considered indignation.

From the heading of the Editorial it would appear the words "disgraceful waste" constitute a very sore point, and I would ask for a fair and careful consideration of the facts. We are now spending freely of our money and excellent research potential investigating possible methods of synthesizing hydrocarbons with which to enrich coal gas and thus obtain a greater yield of gaseous therms per ton of coal at the standard calorific value, although in your Editorial of Jan. 3 last you suggest such processes may only be applicable should the cost of gas oil become prohibitive.

Now I have shown that hydrocarbons are available at the plastic layer and that at a later stage they become largely decomposed, with which you agree, though you appear to be somewhat confused, not having carefully read the Paper, since it is not by condensation of oils in the core of cool coal and its subsequent re-evaporation that the great amount of decomposition occurs, but on the hot side of the plastic barrier.

Does it not therefore appear to be a "waste," when cheap hydrocarbons are so urgently needed, to allow Nature's gift of these products to become largely destroyed to produce carbon and hydrogen, and is it not "disgraceful" to allow complacency to prevent the vigorous exploration of every possible method of eliminating this destruction?

You remark that the conditions for high oil yield from coal are well known, and state that existing processes do not even approach the theoretical standard yield mentioned in the Paper. Without any other reason you deny its possibility, and say "the fallacies in this argument are too obvious to those acquainted with the subject of the constitution and decomposition of coal to require elaboration here."

Having made a continual specialized study of the mechanism of carbonization for the past 25 years, these are not obvious to myself, and as there may be a few others who will admit to similar ignorance I should be pleased to have some of these explained, and trust they will be more reliable than your statement that "it cannot be seriously argued, for example, that volatile matter evolved in the higher ranges of temperature, in which hydrogen predominates, is derived from the decomposition of hydrocarbon."

When coke apparently fully carbonized at, say, 1,000°C. is heated to still higher temperatures, hydrogen is evolved. Can you suggest where it comes from? Do you suggest it was present in the free state before heating? And if it was combined, could it be with anything but carbon as hydrocarbon?

On this argument alone—so obviously erroneous—you state: "The conclusion must be that the practical yield of oils derivable from coal by carbonization of normal coals is unlikely to exceed about 25 gallons per ton under any conditions commercially practicable." I think most of your readers will agree this is a very ill-founded conclusion.

You may have failed to note the comments I made at the meeting relating to oil yield and its possible interest to the Gas Industry, or I am sure you would not have written the rather facetious remarks as to passing oil through gas mains.

You ask, if the production of oil is aimed at, why not use the Fischer-Tropsch or hydrogenation processes, yet on Jan. 17 you appealed for "business acumen," and on Jan. 3 you insinuated that such processes using high pressures are too costly and complicated at present for gas manufacture.

Finally, you have missed the point of the production of a more reactive coke which you have been encouraging for so long in your Editorials.

Partington. Yours faithfully,
July 18, 1945. T. BIDDULPH SMITH.

Protection against Corrosion

DEAR SIR,—Your Editorial relating to Mr. T. Biddulph Smith's thesis and Mr. Gill's remarks regarding "Miss Research" lead us to write you regarding the remarks of Mr. H. J. Escreet relative to pipe corrosion tests ("JOURNAL" of June 27, p. 823), wherein he refers to the Report on Protective Coatings presented in November, 1935.

At the time this Report was published we queried the accuracy of some of the findings, and particularly the inference that the results of the tests given on plastic wrappings referred to "Denso."

In correspondence with the Authors we received an expression of regret that the word "Denso" "slipped into reference 29," and an admission that another product was also the subject of test, so we were content to wait for the, to us, more conclusive results of use over a period of years under practical conditions.

Ten years have passed. We venture to suggest that most gas engineers have now had sufficient experience of the protection given by "Denso" to conclude that practice is preferable to theory.

When we read your words, "Technical men will always keep an open mind, and will always be prepared to change their opinions when proof is given" ("JOURNAL," July 11, p. 44), we wonder if this applies to all technical men, and why the Codes of Practice Sub-Committee apparently ignored the "March of Science" as demonstrated by "Denso."

The expression "Convince a man against his will, he'll hold the same opinion still" may also apply to some technical men, and we venture to suggest that the service pipes just relaid in Hyde Park will need to be replaced long before the "Denso" wrapped pipes laid in 1935, wherever they are.

"Denso" contributed so largely to the success of D Day operations at we are compelled to echo Mr. Gill's concluding remarks.

WINN & COALES, LTD., Yours faithfully,
Terminal House, S.W. 1. F. B. COALES,
July 25, 1945. Director.

Diary

Aug. 16.—Domestic Development Committee: Gas Industry House, 2.30 p.m.
Sept. 7.—North British Association of Gas Managers: Annual Meeting, Glasgow.
Sept. 11.—British Gas Council: Gas Industry House.

B.G.C. Executive Board

The Ballot by Members of the British Gas Council for the election of 12 members to the Executive Board which was completed on July 24 has resulted in the election of the following: F. C. Briggs, T. Brown, Colonel W. Moncrieff Carr, C. H. Chester, E. Crowther, Dr. E. V. Evans, D. Fulton, C. H. Leach, A. W. Lee, C. S. Shapley, Colonel H. C. Smith, and S. E. Whitehead.

The result of the ballot will be reported at the next meeting of the Council, which is to be held at Gas Industry House on Sept. 11, when members will be asked to complete the election of the Executive Board by ensuring that all Districts shall have a representative upon the Board.

At the last meeting of the British Gas Council Mr. A. E. Sylvester was appointed Chairman of the Executive Board and was therefore not subject to the ballot.

Dividends

Commercial.—The Directors have decided that consideration of the accounts of the Company shall be deferred until the accounts for the year 1945 as a whole are available. In the meantime no announcement can be made with regard to dividends on the capital stocks of the Company.

Gas Light and Coke.—For the half-year ended June 30: On the 4% Consolidated Preference Stock at the rate of £4% per annum; on the 3½% Redeemable Preference Stock, 1970, at the rate of £3 15s.% on the 3½% Maximum Stock at the rate of £3 10s.%; on the Ordinary Stock at the rate of £5% (£2 10s. actual). The dividends are in all cases subject to deduction of income tax.

Wandsworth and District.—For the half-year ended June 30 at the following rates: On the 4% Preference Stock, £4% per annum; on the Consolidated Stock, £5% per annum; both less income tax. Warrants will be posted on Sept. 1.

De La Rue Gas Development, Ltd.

In his statement circulated with the report and accounts to be submitted at the general meeting to-day of Thomas De La Rue & Co., Ltd., Mr. B. C. Westall, the Chairman and Managing Director, explained that a further sum of £20,000 is being placed to general reserve, making, with £30,000 transferred from a bad debts reserve no longer required, a total of £350,000, so that the general reserve now exceeds the amount of the issued capital.

Referring to the work of the Company's research and development department, he said this had brought them a considerable knowledge in the application of gas to industry; and he mentioned the acquisition of the whole of the capital of Thomas Potterton (Heating Engineers), whose products would, he believed, command a wide sale in the near future. Their connexion with the Gas Industry had given them reason to believe that there was also a wide field for modern economic household gas appliances. As such a business could not conveniently be conducted either in the premises or through the sales organization of Messrs. Potterton, they decided to form a new company, the De La Rue Gas Development, Ltd., by which the new appliances would be made. He added that Mr. Leopold Friedman, who had been intimately connected with the Gas Industry and whose name was known and respected by all the gas undertakings of the country, had been appointed Managing Director of De La Rue Gas Development, Ltd.

Steel Industry Research

Research work in the steel industry, which recently announced its £120,000,000 plans for re-equipment, is to be amplified by a central organization, which will promote co-operative research in the industry as a whole, and will itself conduct general research into scientific problems concerned with steel. The new organization will receive up to £250,000 a year from the industry, and its total revenue will be in the neighbourhood of £400,000 a year. The head of the organization will be Dr. C. F. Goodeve, O.B.E., F.R.S., at present Assistant Controller for Research and Development at the Admiralty.

The new concern will be known as the British Iron and Steel Research Association. To some extent co-operative research has already been fostered by the work of the Research Council of the British Iron and Steel Federation, while the technical research workers in the industry have maintained mutual contact individually through the Iron and Steel Institute. The present plan, however, is designed to extend the field of co-operative research and exchange of information very greatly, and also to add a good deal of central research on matters of common interest.

Discussing the new Association Dr. Goodeve explained that according to the present plan, the industry's own research centres would work in conjunction with those of the universities. Teams are already working in Sheffield, Cambridge, Swansea, Glasgow, London, Birmingham, and Newcastle. Full-scale development work will take place in or alongside works of member firms. The headquarters of the Research Association will be in London. The Research Association, he added, will, on behalf of the industry, work with technical bodies studying the raw materials, such as coal and refractories, and design of plant used in making iron and steel. It will also bring together the users and the makers of iron and steel, for common study of problems.

Stoke-on-Trent Records

In his report for the year ended March 31, Mr. J. E. Stanier, Chief Engineer and General Manager of the Stoke-on-Trent Gas Department, states that the total gas output was 3,722,104,000 cu.ft., compared with 3,068,284,000 cu.ft. for the year ended March, 1940. Substantially higher deliveries would have been recorded if the majority of the glazed tile factories had not discontinued production following the outbreak of war. Although the industrial consumption of many processes increased as a result of war activities, this was not equal to the loss of the glazed tile kilns which were obliged to close down. In the past year the output was on a par with that of the previous year, notwithstanding the compulsory cuts in industrial consumption. Increased demands were made by domestic consumers, and all previous daily, weekly, and monthly records of output were exceeded during the severe weather last January.

Sanction was received from the Ministry of Fuel and Power in February to proceed with a comprehensive scheme of extensions to the manufacturing plant at the Etruria works. These include the installation of a continuous vertical retort plant capable of producing six million cu.ft. per day, with coal and coke handling plant, complete with 500-ton external coke hoppers equipped with duplicate coke screening plant. Ancillary plant for the treatment of the gas produced will be provided for by the erection of two sets of three million cu.ft. per day horizontal water tube condensers, and duplicate electrostatic precipitators, each capable of dealing with six million cu.ft. per day, with new exhausters and ammonia washing plant of similar capacity. Approval in principle was given in January, 1944, and permission was received for the first section of two million cu.ft. per day to be put in hand immediately. It is anticipated that this portion of the extension will be ready for gas-making towards the end of the year. When the full six million cu.ft. per day plant is completed (at the end of 1946, so far as can be seen at present), the manufacturing capacity of the Etruria works will be nearly double its present rated output.

Domestic sales through automatic meters amounted to 1,396,538,500 cu.ft., an increase of 12% over the previous year. Sales of gas for industrial purposes totalled 1,693,706,800 cu.ft., against 1,896,899,700 cu.ft. for the previous year. With the exception of increased consumptions for the glazed tile and electric porcelain trades, all the other sections of the ceramic industry operated on reduced consumptions to meet the instructions of the Ministry of Fuel and Power to conserve fuel.

Expenditure during the year amounted to £465,227, an increase of £37,303, the major factor in the increase being the rise in the cost of coal, which amounted to £21,793 more than in the previous year, although the tonnage of coal carbonized was lower by 5,243 tons. Total income from the sale of gas was £382,178, an increase of £12,932. This was largely on account of the increased quantity of gas used by domestic consumers. Income from all sources, at £551,678, showed an increase of £19,160. The report points out that additional expenditure will have to be borne this year owing to further increases in the price of coal, and to other items of expenditure on account of renewal of mains, interest and redemption charges on the new plant, &c.

In presenting the report to the Corporation, Alderman A. E. Hewitt, Chairman of the Gas Committee, paid tribute to the work of the Chief Engineer and all the staff, and said the profit last year was £28,000, and reserves amounted to £215,000.

Underground Pipe and Cable Installation

On July 11 Messrs. Skylux Ltd., Engineers, Brunel Road, London, W. 3, demonstrated the abilities of their new thrust borer at Horley, Surrey. Machines were shown in action on three separate bores under a concrete road, and it soon became apparent that much has been achieved to make this most desirable and economical method of service installation common practice.

The first demonstration was a thrust 25 ft. long under the road, and was carried out from start to finish in 50 minutes. The prior work included the digging of the thrusting and receiving pits and the setting of the machine into position. During the initial stages of the thrust the simple method of sighting and levelling the machine was fully explained.

The visitors were then taken to the second demonstration, and here it was explained that a problem had been designed to illustrate two points—the ability of the machine to bore at any gradient, and to show the use of gradient thrusting for avoiding prior installations. The crossing was under the same roadway, and the machine was set for the pilot thrust to travel between the hard core of the road and a telephone installation 8 in. lower and to emerge in the receiving pit 25 ft. away. It being decided to commence the bore at a depth of 2 ft. 9 in., a climbing gradient of 7 in 100 was necessary, which was obtained on the machine by a special spirit level, also used for measuring any rise or fall of ground. Test proved that the specified gradient had been maintained throughout the whole length of bore.

A lead pipe was subsequently attached to the pilot thrust tube at the receiving pit, and by reversing the ratchet knobs only on the machine, the pipe was drawn into the smooth hard bore, the machine being able both to push and pull in the one setting.

The next demonstration took place across the same roadway and had two principal aims—the formation of a 7½-in. dia. bore and to show how the machine works in a restricted area: in this case between two 4-in. dia. prior installations at 18-in. centres, running parallel to the road. A level thrust bore of 7½ in. dia. was successfully completed, and both pits were then cleared to allow inspection of the soil around the hole, which proved to be quite hard and smooth owing to its displacement and high compression.

While the boring progressed, it was stressed that before the design of the machine was commenced, much consideration had been given to the reasons that had hindered thrust boring from becoming common practice, and it was added that the Skylux thrust borer gives accuracy in alignment of thrust and requires but the briefest acquaintance for its successful operation. To enable the operators to check that their bore is maintaining the required direction and level throughout the thrust, an electric lamp is incorporated in the pilot which shines down the thrust tubes towards the machine, and should a deflection of 2 in. or more take place from a straight course, the light disappears from view.

The Skylux thrust borer has three thrusting speeds, and will form bores of 2¾ in. dia. to 7½ in. dia. in any soil.

The Latest Issue of *Reflections*, the News Sheet of the Eastbourne Gas Company, contains an account of enemy damage to the undertaking. In the course of the 96 enemy raids upon Eastbourne much damage was done to the Company's property—gasholders, buildings, mains and fittings, all suffered, and the cost of repair has been estimated to be £60,500.

North-Western Fuel Luncheon Club

On generally similar lines to the Fuel Luncheon Club which has been running successfully in London for many years, the North-Western Fuel Luncheon Club has been formed, with headquarters at Manchester. Sir Frederick West has accepted an invitation to become first President, and a number of leaders of the fuel industries in the area have been invited to become Vice-Presidents. Providing reasonable support is forthcoming, the Committee will proceed with arrangements for a full programme of luncheon meetings and speakers for the coming session, opening in October.

Help and guidance has been given by members of the London Club in connexion with the formation of the new Club. Bulletins will be published and circulated to all members in connexion with every luncheon meeting, containing reports of the previous meeting, full particulars of the next meeting, general information on the technical and social activities of the Club, and details of other meetings and events connected with the fuel industries. Sir Frederick West and Mr. A. C. Dunningham, Chairman of the North-Western Section of the Institute of Fuel, are *ex-officio* members of the Management Committee, and the other members are Mr. S. J. Baily, Mr. R. Baker, Mr. S. N. Duguid, Mr. P. T. Kirkman, Mr. J. H. Orr, and Mr. A. H. Slade. Mr. R. Baker, of Selas Works, City Road, Manchester, 15, is the Hon. Organizing Secretary.

Glasgow's Wartime Gas Supply

In a review of the work of the Glasgow Gas Department during the war years, 1939–1945, Mr. J. W. McLusky, Engineer and General Manager, states that gas made and purchased in the year just ended totalled 12,839,370,000 cu.ft., compared with 10,091,726,000 cu.ft. in the year ended May, 1940, showing an increase of over 27%. At the outbreak of hostilities the Department was contemplating arrangements for a reconstruction and repair programme affecting three of the four works, but owing to anticipated difficulties in obtaining sufficient steel and refractories the scheme was modified to form a rebuilding programme of existing plant so that gas production could be maintained and increased. The rebuilding programme was spread over four years, and most of the work was done in the summer months when gas demand was reduced.

At one works two carburetted water gas plants, each with a capacity of 2½ million cu.ft. per day, were completed and working in the first year of the war. A third section, of the same capacity, was installed later as standby, to ensure that two units would always be available for production. An another works two 2½ million cu.ft. per day units were constructed and were producing early in the fourth year of the war, existing smaller capacity carburetted water gas plant and blue water gas plant being kept in production until the new plants were ready. In the autumn of 1940 a supply of unpurified coke oven gas was taken from coke ovens in the City, purified at one of the works and mixed with coal and water gas before passing to the district. A small daily supply of purified coke oven gas was taken from coke ovens six miles from the nearest gas-works from the autumn of 1941 until the ovens closed down early in 1943, this supply being taken directly into the distribution system. In the early summer of 1943 an intermittent supply of unpurified gas was commenced from a large coke oven plant nine miles from the nearest gas-works, and purifying, storage, and boosting plants were installed by the Department on a site near the coke ovens. The supply remained intermittent until last spring, when a continuous supply became available.

A benzole recovery plant of a washing capacity of 14 million cu.ft. per day was in operation at the outbreak of war, and continued in use until increasing gas demand necessitated the stoppage of benzole production. A second plant, with a washing capacity of 10 million cu.ft. per day, was installed during the war and commenced benzole recovery in 1943.

On the distribution side, the Department concentrated on maintaining gas supplies to industrial concerns producing war equipment, food production establishments, and residential property. Many new works and factories were opened up and others were taken over and switched from peacetime to wartime production, and to supply these with gas was at times a severe strain on the capacity of the mains. Pipes of much greater capacity had to be laid, and in a few instances low-pressure mains had to be utilized for high-pressure distribution.

The area of supply was comparatively free from war damage, but in two nights in March, 1941, no fewer than 120 mains fractures had to be dealt with. Within three days the Department was able to report to the Area Emergency Committee that no consumer, industrial or domestic, need be without gas. In addition to dealing with damage in the Glasgow area, a number of mainlaying personnel gave valuable assistance to the Greenock Gas Department during and after the attack on that area. Supplies of appliances were restricted, but a service of these was maintained in all necessary cases, and all demands for emergency supplies and appliances for war purposes were satisfied.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Works Building Practice

In the course of a Paper to the Western Junior Gas Association, Mr. W. New, of the Plymouth and Stonehouse Gas Light and Coke Company, explained that his following notes referred to general building and structural practice at the Plymouth Works. He continued: In normal times all masons' work is carried out by our own labour. This has been found to be a satisfactory arrangement, as there is thus the skilled labour available at any time for the usual repairs and renewals of gas-making plant and boiler settings, while general repairs to works buildings, offices, and an adjoining street of houses owned by the Company, together with new construction, keep the men employed for the remainder of their time.

Most of the more recent buildings which have been erected on the works are of the usual steel-framed type, but the building material used in panel fillings and piers is, perhaps, not so widely employed. This consists of concrete blocks, manufactured from stone or clinker aggregate, in thicknesses varying from 2 in. to 6 in., by 14 in. or 18 in. long and 9 in. deep. They are much less costly to erect than brickwork, as each block when laid shows the same superficial area as six bricks, and, although it takes rather more time to handle than one brick owing to its weight, it obviously does not take six times as long. The cost of the blocks themselves is also slightly less than their equivalent in bricks, and there is a saving of two-thirds of the mortar which would be used on brickwork.

The ordinary plain blocks, if pointed after laying, present an acceptable appearance, but they may be rendered, if desired, with any type of plaster, and we have experienced no trouble with subsequent flaking off or cracking. Quoin blocks are made to suit the normal blocks, being either 14 in. or 18 in. long with a 9-in. return. These give much greater strength than is obtained by merely tying-in the square blocks at the corners, and also give a more finished appearance to piers, &c.

The blocks are obtainable with various surface effects, brought about by inserting a layer of ground aggregate of the stone which the finished block is intended to represent, and in some cases also by shaping the mould to produce the desired effect on one side.

Concrete blocks have been used with considerable success in the construction of a new C.W.G. plant house and as linings and partitions in coke bunkers, where they appear to have an indefinite life. Their employment in this connexion has been particularly useful in the renewal of partitions in old bunkers, where disturbance of the junction with the side plates may make it necessary to renew steelwork which would otherwise carry out its function for several years. The partition is erected by "burning" out the old steelwork and erecting a light rolled steel joist framing capable of carrying the blocks.

In general our experience has been that buildings of the type required on a works can be rapidly and satisfactorily constructed of this material.

Any large jobs in structural steel are contracted out to a firm of constructional engineers, but a certain amount of work in connexion with light steel framing and plate work for bunkers, &c., is carried out by our own employees. A portable electric welding machine has proved a most useful adjunct, not only when used directly by ourselves, but also by contractors engaged on the works. The machine was constructed in our shops at small cost, and in the latter employment alone has probably paid for itself more than once. A plater and an erector have been trained in the use of the oxy-acetylene torch, with dissolved acetylene or propagas, and this has proved invaluable in carrying out all types of repairs and alterations to steelwork.

An example of this was the renewal of division plates in our vertical retort house coal bunkers, this being done while the plant was at work. The plates and stiffeners had become so worn that the bulkheads had bulged under the pressure of coal. It was not considered advisable to force these back into position at the top angles, but two runs of heavy angles were placed along the top of the bunkers at right angles to the division plates, and electrically welded to them, thus holding them in their present position. New plates were welded to the original tee stiffeners and the old plates burnt out. The projecting legs of the tees were then cut back as close as possible to their tables with the torch and new ones electrically welded to the newly fitted plates.

These operations were carried out by men working on top of the coal as it descended through the bunkers, the coal slide being opened only when it was necessary to open the coal valve. Due warning was, of course, given to the men at such times.

We learn from the Swedish International Press Bureau that owing to the precarious fuel situation gas has been rationed in Swedish towns ever since April of this year. Sweden has, however, made great efforts to exploit her own natural resources—the cutting of wood-fuel has been intensified as well as the production of charcoal and peat. Lately peat has been used on a considerable scale for producing peat-coal, which has been found to yield gas of good quality. The gas-works of Sweden's three biggest towns, Stockholm, Gothenburg, and Malmö, have formed a special company for the production of peat-coal, which has recently erected a fairly large plant in the neighbourhood of the little town of Ljungby in Southern Sweden. A few smaller factories have also been built. The capacity of the new plant is estimated at 140 tons of peat-coal a day, for which 300 tons of ordinary peat is required. The quantities of peat-coal which can be produced in Sweden are by no means sufficient to cover the gas-works' full requirements of fuel, but it is estimated that it will be possible to replace 10 to 15% of the coal by this product.

Reorganization of a Gas Distributing System*

By FREDERICK BELL, B.Sc.,
Distributing Engineer, Liverpool Gas Company

THE recent movement of a considerable proportion of the Liverpool City domestic and industrial load to districts on the perimeter of our area of supply created a problem in gas distribution with which it was most difficult for us to deal, since this Undertaking had no high pressure or intermediate high pressure mains and therefore no district governors. All the gas pressures for the area were controlled by station governors situated at our seven works or holder stations. The total increase in gas consumption on the outskirts of the Company's area had therefore to come from these station governors, which were in many cases up to 7 miles away from the area of consumption. At peak delivery periods, station governor pressures were increased in stages until many of them carried 12 in., and even then could only maintain pressures in the order of 2.0 in.–2.5 in. at the most distant points. To eliminate these unsatisfactory conditions and maintain adequate district pressures irrespective of demand meant considerable modification of our distributing system.

The map (fig. 1) shows our area of supply and the positions of our manufacturing works and distributing stations. Indicated also are several of the larger distributing mains.

One method of dealing with this problem would have been to lay a new high pressure main following the general line of a semicircle between the Linacre and Garston Works, and to fix the necessary high-low district governors to feed back into the low pressure distributing system. This would have supplied the central area of Liverpool perfectly, but areas to the north at Crosby and Formby and to the south at Huyton would have had to be dealt with by laying separate high pressure mains.

District storage, either by automatic high or low pressure holders, was considered, but some of the areas to be supplied were so congested and the sizes of the subsidiary mains, relative to the principal distributing mains, so small that this method would not have had the desired effect.

Conversion of Trunk Mains

Examination of the route taken by some of the larger distributing mains showed that the most satisfactory and economical method of solving our difficulties would be to convert some of these mains to carry gas at intermediate high pressures and to fix district and service governors where necessary.

Our first scheme was to convert the 24 in. Crosby main, which runs north from Linacre Works, into intermediate high pressure, and to install an 18 in. governor at a point 2 miles from Linacre Works, where the main commenced distribution, and to feed the district with gas at controlled governed pressures. This main then continued as an 18 in. for a further 1½ miles to Blundellsands, where a 15 in. governor was installed. These two governors supply 18,000 consumers, and whereas under the old arrangement the works governor carried 10 in. at peak periods in a vain attempt to supply the district, we now find that the true demand calls for a pressure of 24 in. W.G. on our intermediate high pressure main to enable these new governors to maintain adequate district pressures.

FIG. 1.—*Plan of the Liverpool Gas Company's area of supply, showing position of some of the larger mains.*

At a point about 1 mile north of the Blundellsands governor we had a 12 in. main carrying gas from the ordinary low pressure system to a small district at Hightown 2 miles away, and then on to Formby, a further 3½ miles.

Formby has local storage in the form of two small spiral-guided holders, and these were stocked by sucking gas out of the 12 in. main which runs from Blundellsands *via* Hightown. The original idea in 1935 was that the holders should be filled during off-peak periods, but the load in Formby has increased so much that the suction booster was running 24 hours per day, and during days of high demand the pressures at Hightown were often continually at 2 in. W.G. We therefore obtained permission to lay a 15 in. main from the inlet of the Blundellsands governor to the point where the Hightown and Formby supply was originally connected to the district mains. This has enabled us to separate the Formby supply, connect it on to the new 15 in. main and pass intermediate high pressure gas to Formby. By use of a small district kiosk governor, the Hightown district is now adequately supplied.

Another main, a 20 in., running 2 miles eastwards from Linacre Works to the Fazakerley district, carries a heavy load both for domestic and industrial consumers for which 10 in.–12 in. pressure at the works governor did not satisfy their demands. By the use of a few service governors, two small kiosk governors, and a terminal 15 in. governor, intermediate high pressure gas has been taken into the centre of the heavy consumption area and gas delivered at controlled pressures.

* Paper to the Manchester and District Junior Gas Association.

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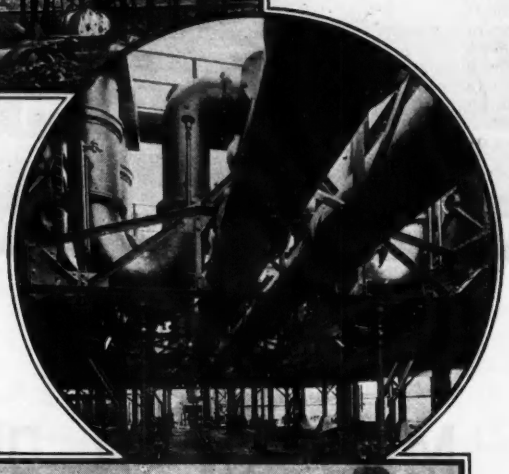

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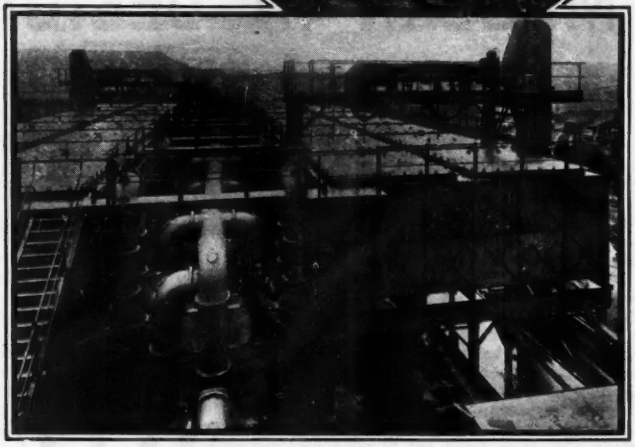

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From the Linacre Works another main, 30 in. diameter, carrying a peak load of over 500,000 cu.ft./hr., runs south-east to a densely populated area of Walton, Norris Green, and West Derby. This main was admirably suited for conversion to intermediate high pressure, and at a point 1½ miles from the works a 15 in. connexion through a 15 in. governor was installed to supply Walton. A 24 in. branch from the 30 in. main at Walton ran to Norris Green, 2 miles away, where a further 15 in. governor was fitted. At a point 3½ miles from the works, the connexions from this 30 in. West Derby main became so numerous that a final breakdown was necessary, and an 18 in. governor was installed. When this 30 in. main was connected to the station governor at Linacre, the maximum pressure carried was some 10 in., whereas now over 30 in. has to be provided at the works to satisfy the district demands on maximum delivery.

The conversion of these low pressure trunk mains to carry higher pressure presented its difficulties, and a few small connexions had to be cut off from the trunk mains and connected to the adjoining low pressure system. In some cases these isolations from the trunk mains would have meant considerable drop in district pressure, so on these occasions small separate governors—4 in., 6 in., or even 8 in.—were installed in kiosks to satisfy the local demand.

Gas distribution from the Garston Works in the southern section of our area was becoming more and more difficult, and two of the trunk mains from this station had to receive similar treatment to the Linacre mains.

The Speke and Huyton main is 24 in. diameter and runs through housing estates, industrial areas, and open country to Huyton, some 7¾ miles away, where it splits up into an 18 in. and 12 in. to supply two more large housing estates. This main had been supplied through a works governor automatically loaded by Widlake control so as to maintain a 4 in. pressure at Huyton. Peak load pressures often rose to 12 in. W.G. without satisfying the Huyton demands. The consumers connected to this main for the first five miles had to suffer most undesirable pressure variations so that an adequate supply could be obtained at Huyton.

The problem of separating the local supplies from this main was more varied and more difficult. Reference to the map (fig. 1) will show how this Huyton main takes a route near the southern boundary of our area, and smaller mains run from it northwards and westwards towards the centre of our area. Our first large governor on this main was a 15 in. situated 1½ miles from the works, and this supplied three 12 in. mains for the Speke housing estate and industrial area.

Between Speke and Huyton it was impossible to connect the local mains together so that one large governor could be arranged to carry the load. The connexions were such that small housing estates fed by 8 in. and 12 in. mains had to be dealt with separately by the use of 4 in., 6 in. or 8 in. governors in steel kiosks. At the end of the 18 in. main at Huyton a 15 in. governor was installed to supply a large housing estate, while from the 12 in. main which ran through another housing estate more kiosk governors were put down with an 8 in. governor to terminate the supply of I.H.P. gas. In this latter estate (Page Moss) pressures as low as 23/10 in. were often recorded under the old arrangement, whereas now straight-line conditions of 45/10 in. are always obtained.

The second trunk main from the Garston Works, an 18 in., runs northwards towards Woolton, Allerton, and Childwall. Woolton always had good pressure, as this is the most elevated portion of our area, but its supply was obtained at the expense of Allerton and Childwall, where a pressure of only 21/10 in. could be obtained at peak load. This Allerton main was therefore treated in exactly the same way as the one running to Huyton. As a point 1½ miles from the works a 12 in. main runs to the Woolton area, where the high pressure gas was broken down to normal district pressures on a 12 in. governor. The Allerton main continues northwards through residential districts with occasional connexions through kiosk governors, until at Allerton the main commences extensive distribution and the high pressure gas terminates through a 15 in. governor to supply Childwall and Allerton areas. The original works governor at Garston carried peak load pressures of 10 in.–12 in., giving Allerton pressures of only 2 in.; to-day, in order that the district governor can satisfy the peak load demands, a boosting pressure of 35 in. is required.

The foregoing brief survey of our activities indicates how vastly we have been able to improve our distributing system and enormously increase its load potentialities by making use of the existing trunk mains. It is hoped that when circumstances permit we will be able to lay such mains as will link up the Linacre pressure mains at Norris Green with the Garston pressure mains at Huyton, and so provide a ring of intermediate high pressure gas.

District Governor Houses and Kiosks

All our larger district governors—12 in. to 18 in. sizes—are installed in brick-built houses. The difficulty of obtaining sites for these small houses in built-up areas can well be imagined, and it was this problem that materially regulated the size and design of the houses to be built. The positions of the governors were very limited as they had to be near to the existing mains, and so it was found that, in general, sites approximately 12 ft. square could be obtained, whereas larger sites were quite impossible. We accordingly designed our governor and mains layout to suit this small size of house. Governors with inlet and outlet set at 90° were used in conjunction with a 90° bend, which brought the inlet and outlet valves alongside each other in front of the governor. These were all fixed below floor level in an asphalt-tanked basement. The flooring of the houses consisted of open-section steel which could be removed, either totally or in part, for inspection and maintenance. Many of these governors supplied areas about which we had no knowledge as to the rate of gas consumption, load factor, or the gas-consuming habits of our customers, and so, having had experience of Electroflo orifice plate meters, we decided to incorporate such instruments in each governor house installation. The meter we used consisted of a rate of flow indicator, integrator, and a recorder of rate of flow. This continuous record of the rate of flow has been studied in conjunction with the factors which influence gas flow—*i.e.*, pressure of gas, atmospheric temperature, day of the week, season of the year, special days, &c.—and valuable information obtained as to the habits and requirements of consumers in the districts served.

The flow instruments, in conjunction with an inlet governor pressure recorder, outlet pressure recorder, and two clocks for governor operation, are all mounted on a 3 ft. by 6 ft. high steel panel (fig. 2). The governors used throughout are Bryan Donkin double diaphragm type of outlet pressure regulator. The larger governors which are installed in houses are each actuated through an inspirator connected between inlet and outlet of the main governor.

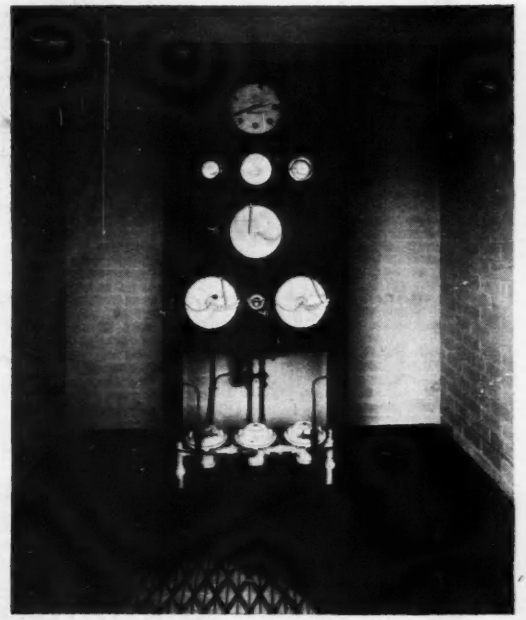

FIG. 2.—*View of district governor house control panel.*

We considered it necessary to provide automatically three different pressures—one during the night, one during the day, and one for Sunday peak. Separate auxiliary governors are used for each pressure, the advantages being: (1) each can be changed independently at will; (2) the "pressure" times can be changed independently; (3) standard clocks can be used as the power required to put the governor on or off is very small.

To keep our boosting pressures as low as possible, it is desirable to have inlet governor pressures which may at certain times be less than the maximum outlet pressure required from the governor during peak demands. This means that the main governor cannot be loaded to give the maximum outlet pressure, because when the inlet pressure is low there would not be sufficient pressure to keep the governor in action. It was therefore necessary to load the main governor for the minimum outlet pressure and use an inspirator to open it on the higher pressures. By the use of this inspirator, we are able to operate at very low pressure difference over the full range of outlet pressures. In other words, the minimum inlet pressure can be less than the maximum outlet pressure, and the governor can still be in control at all times provided some pressure difference is maintained on any given outlet pressure. When you consider that most of our governors are set for a day pressure of 45/10 in., night pressure of 40/10 in., and Sunday mid-day pressure of 60/10 in., and that at times governor inlet pressures during the night of only 6 in. W.G. are quite adequate, the function of the inspirator can readily be appreciated.

The clocks, which are mounted on the panel, actuate one of the three auxiliary governors in turn so as to give one of the three specified pressure conditions.

The inlet and outlet mains to the larger governors were always so arranged that a by-pass valve could be fitted outside the governor

house. On the inlet main to each large governor was fitted an orifice plate using a flanged socket piece, flanged spigot piece, and a "Johnson" coupling. The coupling was used so that the orifice plate could easily be removed for inspection or replacement. The orifice plate, the coupling, and the piezometer ring pressure pipes were all enclosed in a brick manhole fitted with watertight cast iron cover.

Distribution Control

In common, I am sure, with many of the large gas undertakings, we in Liverpool felt the need of a distribution control centre to monitor the movement of gas between the works and the distributing centres, and finally on to the district. In Liverpool we now have such a centre, but it has been felt that if we could maintain all the vital information relating to distribution continuously visible before our controllers, then the control could be more efficiently and effectively performed. At first we were not quite sure just how much information was necessary to attain this end, so we made up an instrument control panel some 22-ft. in length by 7 ft. 6 in. high, having a section devoted to each of the seven works or distributing stations. The upper 2 ft. 6 in. is devoted to dummy instrument bezels complete with dials and pointers to indicate the various types of information which we consider necessary to give the controllers a full picture of the distribution system. These instruments, which are all set in specified positions according to the purpose they serve, indicate:

(*a*) Stock of gas in each of our 23 holders.
(*b*) Rate of gas manufacture at the works.
(*c*) Pressure thrown by holders.
(*d*) Pressure outlet boosters.
(*e*) Flow of gas into or out of a station through interworks mains.
(*f*) Flow of gas on each intermediate H.P. main.
(*g*) Pressure on each station governor outlet.

Along the full length of the centre 3 ft. of the panel is a schematic diagram showing the position of all gasholders, mains, valves, boosters, &c., as they are arranged between the inlet to holders and the point where the distributing mains leave the station (fig. 3). The stations are arranged on the panel in their geographical order: Formby in the north, taking the extreme left position, followed by Linacre, Athol Street, Eccles Street, Grafton Street, Wavertree, and Garston. Formby, as stated previously, is supplied by a district boosting main from Linacre, but all other stations are connected to each other by means of a common trunk "messenger" main which is not connected with the ordinary district distributing system. All mains at the stations along with the connecting "messenger" main are shown in distinctive colours indicating the particular function each fulfils. The valves, indicated by semaphore buttons, are shown in their correct position on the mains relative to all other plant.

The information from which these instruments are set is obtained from each station by direct line telephone, but having acquired this information, the controllers have a perfectly balanced appreciation of the Company's stock, make, and distribution position. All movement of gas after completion of manufacture is therefore controlled from this distribution centre, and always providing such movement does not affect adversely the manufacturing centres in supplying gas of standard quality, it is the duty of the controllers to distribute the gas as efficiently and economically as possible. All instructions for the operation of valves and boosters, the alteration of governor or boosting pressures, emanate from the Control Room, and once an instruction has been given and a return message indicates that that instruction has been carried out, the controller sets up the information on the instruments and mimic diagram. A written record is maintained of all the information collected, and graphs are plotted showing the hourly make, hourly delivery, cumulo make, cumulo delivery, and total stock.

Having decided on the type of information essential for distribution control, the problem which followed was how to collect and indicate such information automatically on our control panels. Our distributing station at Formby was chosen for the initial experimental installation as it was a small unit with holders and district governors. Gas at intermediate high pressures is available at Formby, but local storage must be used for peak-load demands. The governors and connexions in the governor house at this station were rearranged so that the intermediate high pressure gas from Liverpool could supply the district by operating an inlet pressure regulator if the pressure was adequate, but if the pressure was inadequate the supply would be automatically taken up by the holders, which would feed the district governor. The holders were refilled by means of a booster which sucked gas out of the intermediate high pressure main through a combined inlet pressure regulator and non-return valve, and boosted it into the holders. The pressures thrown by the two holders were similar, so No. 2 was weighted to throw an additional 0·5 in. W.G. so that the sequence of filling was:

(*a*) Inner lift No. 1.
(*b*) Inner lift No. 2.
(*c*) Outer lift No. 1.
(*d*) Outer lift No. 2.

The inlet and outlet valves of both holders are kept fully open, and stops are fitted to the bottom kerb of No. 1 holder to prevent it blowing when No. 2 holder is cupped.

To operate this station by remote control it was necessary to know:

(*a*) The amount of gas in each holder.
(*b*) The flow of gas into the station.
(*c*) The gas pressures at the following points:
(i) Station inlet.
(ii) Booster outlet.
(iii) Governor inlet.
(iv) District governor outlet.

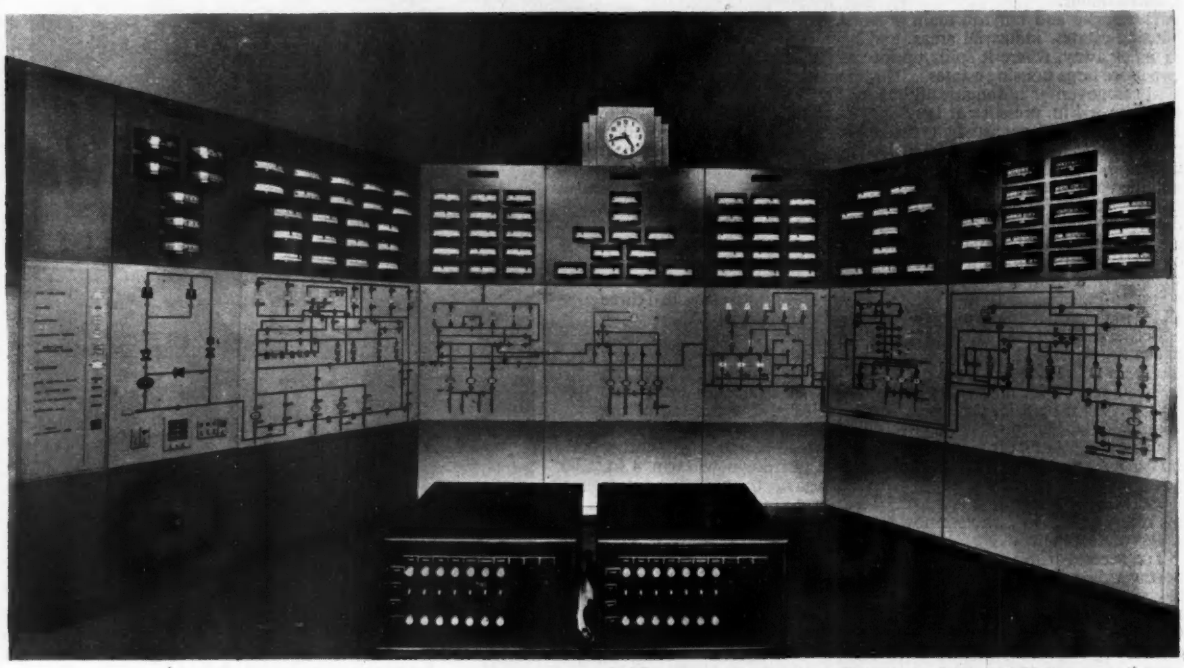

FIG. 3.—*Composite photograph of the central distribution control panel.*

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(*d*) The positions of the internal valves of the two non-return governors, inlet pressure regulator, and the district governor.

(*e*) That electric current was available at Formby.

In addition, we required to receive alarms of certain unsatisfactory conditions as regards pressures and holder contents, and to be able to stop and start the booster at will from Liverpool with confirmation that it was stopped or running.

We therefore contacted the Automatic Telephone & Electric Co., of Liverpool, and with their co-operation a scheme was formulated which would enable us to transmit all the various types of information we desired, and to stop and start the booster, using only a single pair of G.P.O. telephone lines connecting Formby with the Control Room.

The means used for obtaining the above indications and enabling the control of the booster to be accomplished is the Automatic Telephone & Electric Company's system of Supervisory Control. This apparatus uses telephone-type relays and switches, and has been developed extensively over the past 20 years for the remote operation of electrical sub-stations, so it will be seen that, on the electrical side, we were fortunate in not having to use untried equipment. The Supervisory Control system is so designed that a check of the position of the apparatus is carried out before any operation can be proceeded with.

It will be realized that as there may be several possible operations to do at the distant point and only one pair of lines between the control point and the distant point, some form of selecting apparatus must be employed to pick out the equipment to be operated. This selection is carried out by throwing a switch associated with the apparatus to be selected to cause a fixed number of direct current impulses to be transmitted over the line to the distant point. This impulse train uses directional impulses to make the selection. The number of impulses in one direction decides the selection to be made, the remainder of the impulses in the opposite direction being used to check the selection.

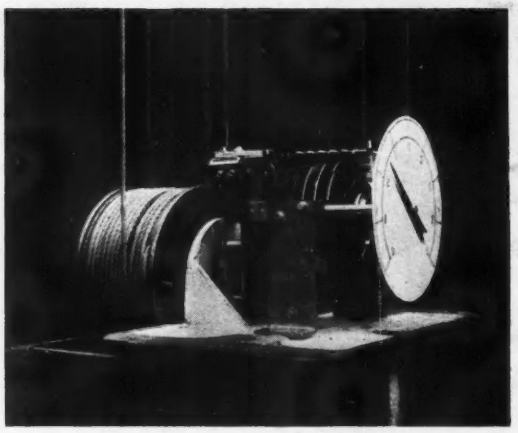

FIG. 4.—*Close-up view of the electrical coder used for holder height indication.*

On completion of the impulse train, the equipment at the distant point is provided with a circuit which, unless the correct number of impulses have been received and unless these impulses have been received in the correct order, rejects the selection and restores the apparatus to normal. If, however, the selection has been correctly made, then a current is transmitted from the distant station to the Control Room to light a lamp on the control board and so inform the operator that the distant apparatus is ready for operation.

Up to this point, although the device to be operated has been selected, no operation has taken place, and the selection made can, if desired, be cancelled without affecting any apparatus at the distant station. The actual operation after the selection is completed is carried out by pressing a push-button, which is only effective when the lamp on the control board indicating a correct selection is alight.

The actual operation at the distant station is carried out by an impulse of current from the Control Room transmitted under the influence of the "operate" push-button.

If the operation to be performed is of a simple type such as the starting of a booster, the indication that the booster has started is returned to the Control Room as soon as the "operate" impulse on the line is completed. When this indication is received, the selecting switch or key on the control board can be restored to return all apparatus to normal. Automatic indications of the change of position of apparatus at Formby is transmitted to the Control Room again by a fixed number of direct current impulses, each impulse in the pulse train representing a device to be indicated, and the direction of impulse (*i.e.*, either "positive" or "negative") "sets" the indicating device on the control board to the desired position. On completion of the pulse train, the receipt of the correct number of impulses is checked, and should there be any error in this, a re-check is automatically initiated.

The method of transmission of holder contents and pressures was dependent upon apparatus being designed so that the movement of the holders or pressure-indicating apparatus actuated an electrical coding mechanism and moved it through 340° of rotation for the full indication required (fig. 4). This coding mechanism enables a reading of 127 divisions to be transmitted by 7 impulses in the impulse train, the direction of each impulse being controlled by the position of the coding mechanism. The impulses being received at the control point "set" corresponding relays, which in turn cause a resistance to vary, and so convert the impulses received on the line to an ordinary ammeter reading, which is calibrated to either gas volume or pressures.

In the case of the gasholder contents apparatus, a steel cord attached to the crown of the holder is arranged so that as the holder rises or falls the cord is "paid out" or taken up on a drum. The rotation of the drum is geared down so that a spindle attached to the coding device moves through 340° for the full travel of the holder.

For pressures, the apparatus employed the principle of the Kings gauge, the movement of the float being communicated to a grooved pulley situated on the spindle of the coding mechanism (fig. 5). It will be appreciated that all the above readings are of the "spot" type and are called for by the Control Engineer.

Another type of reading is available, and in this particular instance has been used for flow indications. This reading is continuous except for the short periods when the line between the Control Room and the distant point is used for signalling, and since an indication impulse train or a selection impulse train takes only approximately 5–10 seconds, the reading is virtually continuously available.

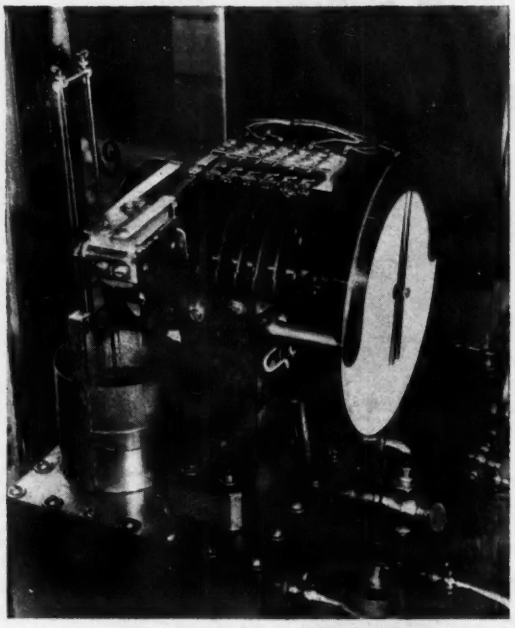

FIG. 5.—*Pressure indication and transmission coding mechanism.*

To obtain information as to the position of the valves in the pressure regulator and governors, we designed equipment that would indicate three positions of each valve—*i.e.*, (*a*) closed; (*b*) just open; (*c*) fully open. These three indications were given in the form of illuminated strips inset in the correct position on the mimic diagram.

We have known occasions when gasholders have been overfilled due to reliance on remote holder contents indicators, and this can be attributed to the use of variable resistance transmitters giving incorrect readings due to changes in G.P.O. line resistance. With the system now considered, the meter readings are obtained from impulses and a complete train of impulses must be received on every occasion. It will thus be seen that G.P.O. line faults, whether consisting of leaks between the lines or alternatively a leak to earth, will not affect the accuracy of the indications, although of course should this fault become severe the complete equipment will be thrown out of action. This will soon be found by the control staff, who will detect that the equipment is not functioning at all, and furthermore they have facilities for checking the operation of the complete equipment at any time should they suspect that the line may be faulty.

As a further safeguard we have included a mechanically-operated mercury switch fixed on the tank of No. 2 holder and actually operated by the holder when within two plates of full. This switch operates the interposing relay situated at Formby and cuts off the booster even though the G.P.O. lines may be faulty. If, however, everything is

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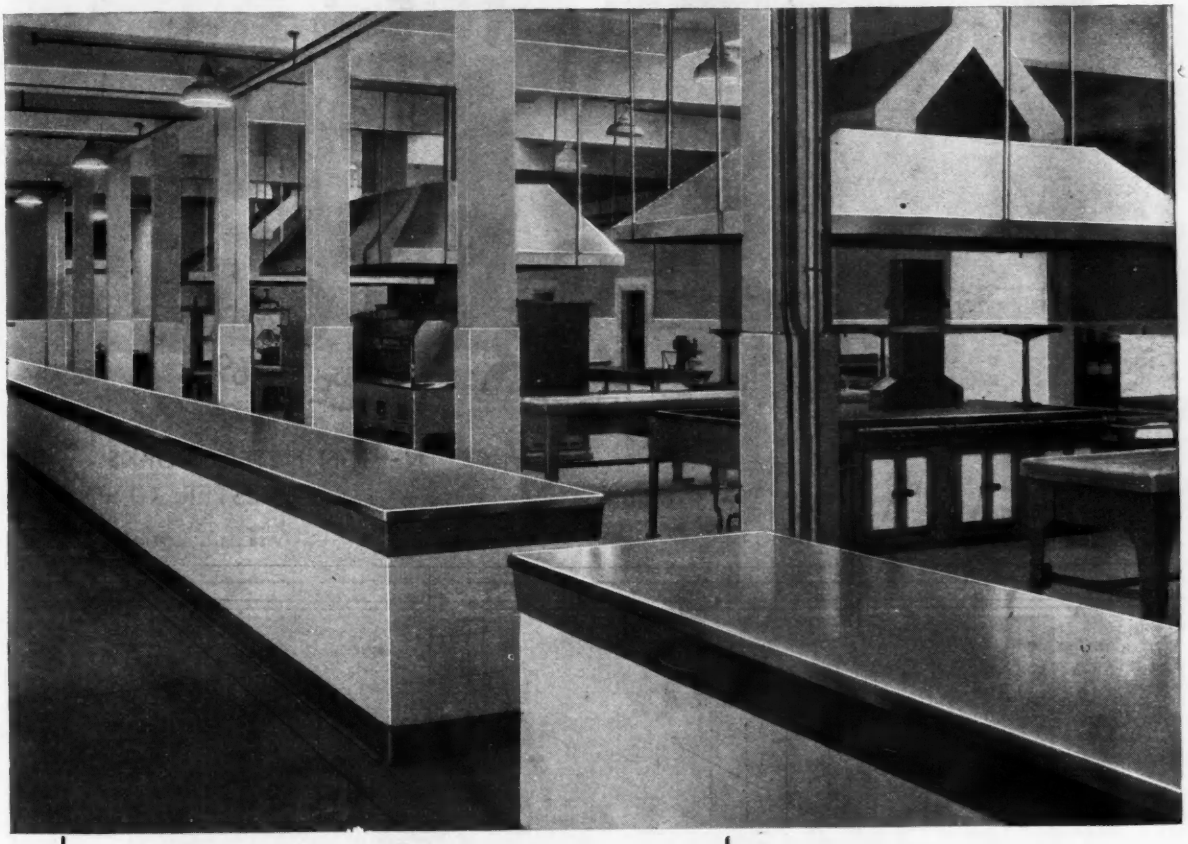

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working correctly, the booster will be cut off by this switch and the alarm will be given back to the Control Room at Duke Street. Similar alarms have been fitted to No. 1 holder which will indicate back at the Control Room that the holder is (*a*) within two plates of uncupping, and (*b*) within two plates of empty.

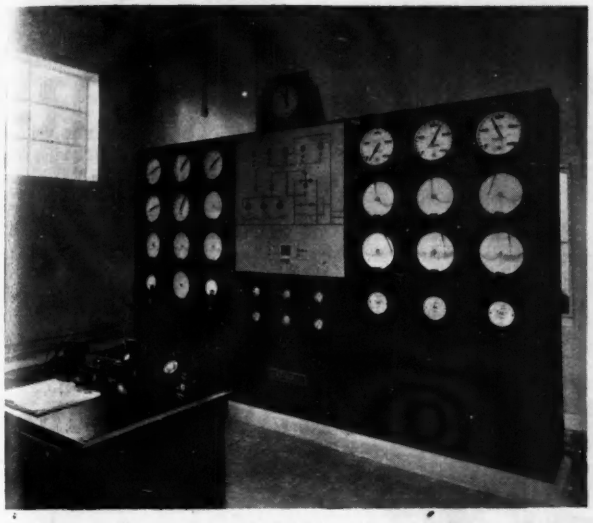


FIG. 6.—*The control panel at Grafton Street distributing station.*

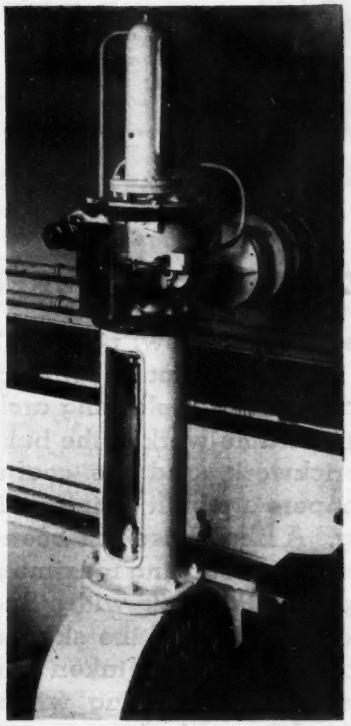


FIG. 7.—*View of motorizing equipment on a 24 in. valve.*

Apparatus designed for transmission of pressure conditions in the Formby scheme has also been used in a modified form to transmit single pressure conditions from a governor house on the district back to the distributing station. It is essential, if boosting costs are to be kept at a minimum, that no higher pressures than absolutely necessary are worked, and therefore the pressures at the most distant points on the boosting mains should be known by the Central Control and the boosters run accordingly.

The same type of apparatus which transmits pressure readings can also be used to load or unload a governor, open or close a valve, or regulate the steam supply to boosting or pumping plant.

Grafton Street Distributing Station

Having tested the supervisory remote control apparatus quite thoroughly on the Formby installation, and found that the principles could have still further applications, we decided to extend its use to our Grafton Street Distributing Station. This station supplies between 3.5 and 4.0 million cu.ft. per day, and comprises a governor and booster house, and 5 gasholders of 4.2 million total capacity. The original governors and apparatus were obsolete, and permission was obtained to renew the governors and rearrange the connexions to simplify the reception, transmission, and distribution of gas. Opportunity was also taken to install a control panel which would give the

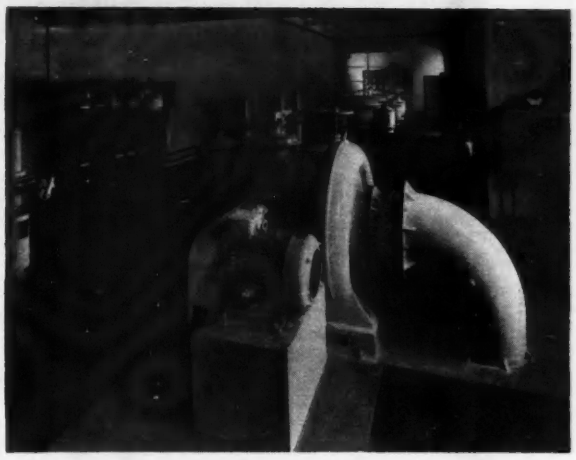


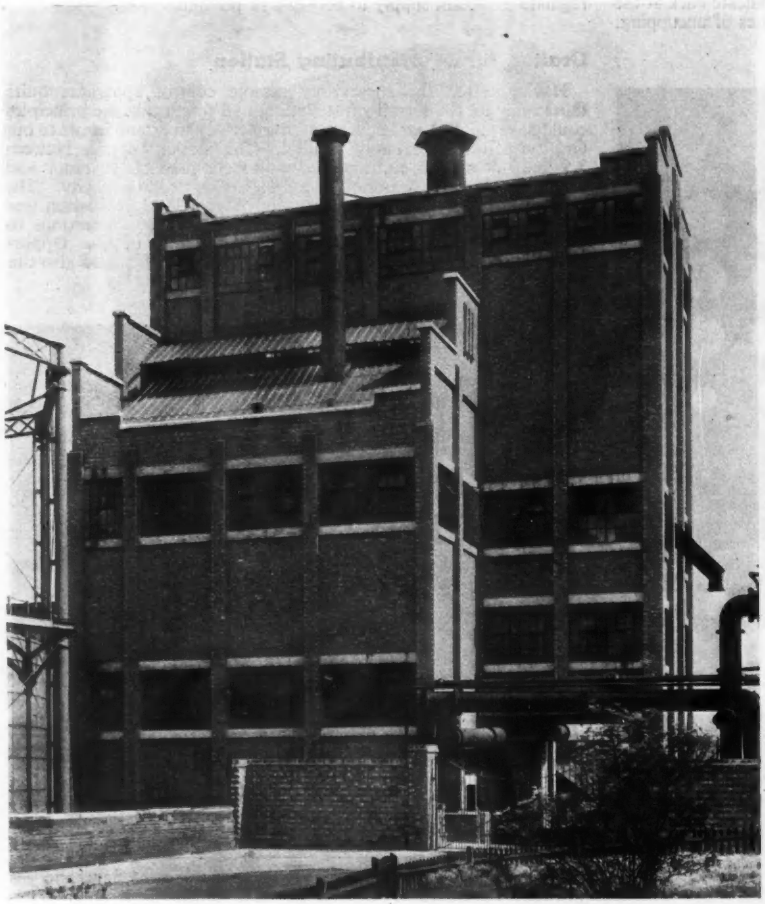
FIG. 8.—*Grafton Street Station. General view showing booster, motorized valves, and governors.*

operators all the information as to holder stocks, gas flow, and gas pressures that would be required for the satisfactory operation of this station (fig. 6). The connexions have been so rearranged that for ordinary gas reception and delivery, only eight valves need to be operated. These are 24 in. Bryan Donkin Hicks type of valve, and have been fitted with Blakeborough motorizing equipment with remote control from the panel (fig. 7). All the holders have gas stock indicating equipment and independent high and low contents alarms. The whole of the work on the station has been so centred in the control room that one operator only is required to perform all duties, which include personal inspection visits to the gasholders. The indicating, recording, and operating equipment has been laid out so that we will be able to transmit all the information and signals back on to the panel of the Central Distribution Control at Duke Street.

On the larger gas distribution stations it is not suggested that the installation of remote indication and control will entirely eliminate personal supervision on site, but it is contended that the scheme will provide the Central Controller with full and continuous indication of the varying distributing conditions throughout the Company.

When it is decided that integration of Gas Undertakings shall take place, then we are convinced that remote control of gas distributing stations will be invaluable, and will materially assist the Industry in improving its distribution service to the consumer.

The Opening Date of the Conference on the Unification of Engineering Standards has been fixed for Sept. 24. In announcing the date, the Combined Production and Resources Board states that the Conference will be held at Ottawa and will be attended by delegations appointed by Canada, Great Britain and the United States. This will be the third in the series of Conferences held during the last two years under the auspices of C.P.R.B. The national standardizing bodies of the countries concerned have been closely identified both with the work of the Conferences and with developing resulting proposals during the intervening periods. It is hoped, as a result of the third Conference, that the differences in practice among the three countries will be reduced still further and that a series of common standards, necessary in connexion with joint military requirements will be ultimately achieved. The further benefits that will accrue from such standardization during peace time need hardly be emphasized.



GLOVER-WEST

Vertical Retorts

at

HIGH WYCOMBE

ARCHITECTURAL FEATURES

From the layman's point of view, perhaps the most interesting feature is the attempt to produce in an essentially industrial building a pleasing architectural appearance. The steel frame-work of the building has been encased in brickwork, and the coal-receiving annexe and coke hoppers are built as integral features of the main building. A liberal use has been made of steel-framed windows for producing maximum natural lighting and ventilation. Parapets with "Snowcrete" coping form a pleasing finish to the skyline. Rain-water pipes are not visible, being taken down internally. The full effect of the building when viewed from Desborough Road is masked to some extent by the abutment of the old horizontal retort house, but when this is dismantled and the new retort house extended it will appear as an independent and symmetrically designed structure.

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Telegrams: WESGASCO, ESTRAND.

GAS PRODUCTS PRICES

The London Market July 30.

There are no changes to report in the prices of Coal Tar Products.

As from March 5, by the Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), the maximum price of Pitch for briquetting has been increased to 60s. per ton f.o.r. supplying works, and the prices for Road Tar, as fixed by the Coal Tar Products Prices Order, 1943, S R. & O. No. 1528, have been increased by one half-penny per gallon. There is also an increase of 5s. per ton in the price of standard Creosote/Pitch Mixture.

The only change to report in connexion with the prices of Coal Tar Products is the coming into effect on June 11 of a new Government Order increasing the prices of Coal Tar Spirits. This Order is entitled the Control of Benzole and Coal Spirit Order, 1945 (S. R. & O. 1945, No. 681).

Control of Toluene (No. 4) Order, 1944 (S. R. & O. 1944, No. 170), contains an amendment of the Control of Toluene (No. 3) Order, 1943.

Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O., 1944, No. 1051), allows increases in the maximum prices for all forms of Naphthalene.

The Provinces July 30.

The average prices of gas-works products during the week were : Pitch and Crude Tar,* Toluole, naked, North, 90's. 2s. 4d. to 2s. 6¾d., pure, 3s. 2¼d. (now controlled by S. R. & O. 1945, No. 681), operative from June 11, 1945. Benzole and Coal Spirit, also Coal Tar Naphtha and Xylole, are now controlled by the Control of Benzole and Coal Spirit Order, 1945, dated June 1, 1945, S. R. & O. 1945, No. 681, operative from June 11, 1945. Carbolic acid, 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943, Naphthalene now controlled under S. R. & O. 1944, No. 1051, operative from Sept. 22, 1944.

Attention is called to Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No 229), referred to on p. 305, "JOURNAL" of March 7.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland July 28.

A quiet tone continued during the week. Refined tar* : Yield to Distillers is 5d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quality,* 5¼d. to 6¼d.; hydrogenation oil,* 5⅞d.; low gravity or virgin oil,† 7¼d. to 7½d.; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha† : 7d. to 8d. per gallon. Solvent naphtha* : Basic prices delivered in bulk, 90/160 grade, 2s. 10d., and 90/190 Heavy naphtha, Unrectified, 2s. 0¼d.; Rectified, 2s. 4d. per gallon. Pyridine† : 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

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GAS STOCKS AND SHARES

Prices were speedily marked down and widened when the trend of the election results on Thursday last became evident, and the heavy falls in some sections, particularly among industrials, which had recently risen considerably, was more attributable to this defensive action than to any heavy volume of selling. British Funds were only fractionally lower, but some sharp setbacks occurred among home rail stocks. A rally set in towards the close on Friday, however, and prices began to recover in all sections.

There was not much business done in the Gas Market, and if the quotations shown in the lists below are any criterion—they are those at the close on Thursday last—the election results have had little if any effect on the prices of gas stocks and shares. During the past four weeks, although there have been fewer changes than for some time past, most of the movements have been in an upward direction, but there were no special features. The following few quotations were changed last week:—

OFFICIAL LIST

Imperial Continental	119—124	−1
Liverpool Ord....	128—133	+2
Mid-Southern 4 p.c. Cons. Pref. ...	104—107	+2
Montevideo	100—105	−2
Primitiva Holdings Ord.	11/6—12/6	−/6d.
Severn Valley 4½ p.c. Cum. Pref. ...	22/—23/-	+-/6d.
South Metropolitan Ord.	88—91	+½

PROVINCIAL EXCHANGES

Bristol 5 p.c. max.	119½—120½	−1
Newcastle Units	26/6—27/3	+-/1½d.

Quotations on the London and Provincial Stock Exchanges

OFFICIAL LIST

Issue. £	When ex-Dividend.	Dividends Interest. Amnt. or Rate% Prev. Hf. Yr. Actual.	Last Hf. Yr. Actual.	NAME.	Quotations July 26
1,767,439	March 12	20/-	20/-	Alliance & Dublin Ord. ...	112—117
891,664	May 7	6d.	6d.	Asscd. Gas & Water U'd'ts Ord.	23/—24/-
388,938	"	7½d.	7½d.	Do. Deferred	23/6—24/6
500,000	March 12	2½	2½	Do. 4½ p.c. Red. Cum. Pref.	21/—22/-
535,545	"	2	2	Do. 4 p.c. Red. Cum Pref.	20/—21/-
341,966	"	2	2	Do. 4 p.c. Irred. Cum. Pref.	19/3—20/3
561,370	Feb. 19	70/-	70/-	Barnet Ord. 7 p.c.	162—167
300,000	June 11	8⅜d.	10½d.	Bombay, Ltd.	42/—45/-
690,407	Feb. 5	70/-	70/-	Bournemouth 7 p.c. max. ...	160—165
362,025	July 11	2	2	Do. 4 p.c. Deb. ...	102—107
659,955	March 5	25/-	57/-	Brighton, &c., 5 p.c. Con. ...	108—113
855,000	" 12	60/-	60/-	Brit. Gas Light Ord.	132—137
545,000	June 25	2½	2½	Do. 5½ p.c. 'B' Cum. Pref.	115—120
120,000	" 18	2	2	Do. 4 p.c. Red. Deb.	95—100
10,000	April 23	9/-	4/6	Cape Town, Ltd., 4½ p.c. Cu. Pf.	6—7
626,860	July 16	70/-	50/-	Cardiff Con. Ord.	124—129
24,500	June 4	8½d.	8½d.	Colombo 7 p.c. Pref.	23/6—25/6
764,169	March 19	4.78d.	4.78d.	Colonial Gas Assn. Ltd. Ord. ..	16/6—18/6
400,000	"	7.649d.	7.649d.	Do 8 p.c. Pref. ...	22/—24/-
1,748,090	July 22 '40	30/-	30/-	Commercial Ord.	62—67
620,000	June 4	1½	1½	Do. 3 p.c. Deb.	74—79
286,344	Feb. 19	2½	2½	Do. 5 p.c. Deb.	115—120
837,560	"	60/-	60/-	Croydon sliding scale	124—129
644,590	"	50/-	50/-	Do. max. div.	107—110
620,385	June 25	2½	2½	Do. 5 p.c. Perp. Deb. ...	125—130
179,500	Feb. 12	50/-	50/-	East Surrey 'B,' 5 p.c.	103—108
176,461	June 25	2½	2½	Do. 5 p.c. Deb. (Irred.)...	124—129
239,135	Nov. 13	6d.	6d.	Gas Consolidation Ord. 'A' ...	22/3—23/3
250,000	"	4½	4½	Do. Ord. 'B' ...	22/3—23/3
250,000	May 7	2	2	Do. 4 p.c. Red. Cum. Pref.	18/6—20/6
19,101,877	Feb. 19	6d.	6d.	Gas Light & Coke Ord. ...	22/9—23/9
2,600,000	"	35/-	35/-	Do. 3½ p.c. max.	82—85
4,477,106	"	2	2	Do. 4 p.c. Con. Pref. ...	103—106
2,993,000	July 16	1⅞	1⅞	Do. 3⅜ p.c. Red. Pref. ...	101—104
8,602,497	May 28	1½	1½	Do. 3 p.c. Con. Deb. ...	89—92
3,642,770	"	2½	2½	Do. 5 p.c. Red. Deb. ...	107—110
3,500,000	"	2½	2½	Do. 4½ p.c. Red. Deb. ...	107—110
700,000	March 12	1⅝	1⅝	Do. 3½ Red. Deb. ...	99—101
5,600,000	May 28	—	†£10	Imperial Continental Cap. ...	119—124
43,820	Jan. 29	1¾	1¾	Do. 3½ p.c. Red. Deb. ...	97—100
2,167,410	Feb. 12	50/-	60/-	Liverpool Ord.	128—133
231,978	" 19	50/-	50/-	M.S. Utility 'C' Cons.	110—115
918,657	"	2	2	4 p.c. Cons. Pref.	104—107
675,000	April 30	‡40/-	‡40/-	Montevideo, Ltd.	100—105
300,000	" 23	£6	£4	Oriental, Ltd.	170—175
368,537	June 11	50/-	57/6	Plymouth & Stonehouse 5 p.c.	113—118
621,667	Feb. 5	72/6	72/6	Portsmouth & Gosport Cons.	157—162
2,381,363	July 9	†9¾d.	†9¾d.	Primitiva Holdings, Ltd. Ord.	11/6—12/6
233,900	Dec. 11	3	3	Do. 6½ p.c. Red. Cum. Pref.	102—107
648,999	July 2	6⅔	6⅔	Severn Val. Gas Cor. Ld. Ord.	23/6—24/6
597,972	March 12	2½	2½	Do. 4½ p.c. Cum. Pref. ...	22/—23/-
2,528,714	May 14	3⅓d.	6d.	South East'n Gas Cn. Ld. Ord.	21/6—22/6
1,000,000	Feb. 26	2½	2½	Do. 4½ p.c. Red. Cum. Pref.	21/9—22/9
1,068,869	"	2	2	Do 4 p.c. Irred. Cum. Pref.	20/—21/-
5,709,895	Feb. 12	†20/-	†40/-	South Met. Ord.	88—91
1,135,812	"	3	3	Do. 6 p.c. Irred. Pref. ...	128—133
850,000	"	2	2	Do. 4 p.c. Irred. Pref. ...	101—104
1,895,445	July 2	1½	1½	Do. 3 p.c. Perp. Deb. ...	87—90
1,000,000	" 16	2½	2½	Do. 5 p.c. Red. Deb. ...	102—107
1,543,795	Feb. 5	50/-	50/-	South Suburban Ord. 5 p.c ...	117—122
512,825	"	2½	2½	Do. 5 p.c. Perp. Pref. ...	113—118
500,000	"	2	2	Do. 4 p.c. Perp. Pref. ...	100—105
250,000	"	1⅞	1⅞	Do. 3⅜ p.c. Red. Pref. ...	93—98
888,587	June 11	2½	2½	Do. 5 p.c. Perp. Deb. ...	123—128
750,541	Feb. 5	50/-	50/-	Southampton Ord.	108—112
350,000	" 12	2½	2½	Swansea 5½ p.c. Red. Pref. ...	105—110
1,076,490	" 26	50/-	50/-	Tottenham & District Ord. ...	121—126
338,555	"	2½	2½	Do. 5 p.c. Pref.	113—118
453,380	June 11	2	2	Do. 4 p.c. Perp. Deb. ...	100—105
1,247,505	"	7½d.	6d.	U. Kingdom Gas Cor. Ord. ...	23/—24/-
1,085,952	May 14	5⅜d.	5⅜d.	Do. 4½ p.c. 1st Cum. Pref. ...	23/—24/-
772,709	"	4½d.	4½d.	Do. 4 p.c. 1st Red. Cum.Pref.	19/9—20/9
745,263	June 18	5⅜d.	5⅜d.	Do. 4½ p.c. 2nd Non.Cum. Pf.	20/6—21/6
1,200,000	March 19	1⅜	1⅜	Do. 3½ p.c. Red. Deb. ...	97—102
380,606	May 7	66/3	66/3	Uxbridge, &c., 5 p.c.	125—130
1,371,138	Feb. 12	50/-	50/-	Wandsworth Consolidated ...	122—127
2,525,768	"	2	2	Do. 4 p.c. Pref.	103—106
1,343,964	June 18	2½	2½	Do. 5 p.c. Deb.	125—130
383,745	"	2	2	Do. 4 p.c. Deb.	100—105
558,342	Feb. 12	50/-	50/-	Watford & St. Albans Ord. ...	122—127

SUPPLEMENTARY LIST

Issue. £	When ex-Dividend.	Dividends Interest. Amnt. or Rate% Prev. Hf. Yr. Actual.	Last Hf. Yr. Actual.	NAME.	Quotations July 26
351,685	June 18	2½	2½	Brighton, &c., 5 p.c. Perp. Deb.	123—128
415,250	"	2	2	Bristol Gas Co., 4 p.c. New Deb.	101—104
140,205	Feb. 12	70/-	70/-	Cambridge, &c., 7 p.c. Cons. 'B'	143—148
295,932	March 12	50/-	50/-	Cheltenham, 5 p.c. Cons.Ord....	110—115
42,500	June 18	2	2	Do. 4 p.c. Perp. Deb....	100—105
150,000	Feb. 19	2	2	Croydon Gas, 4 p.c. Pref. (Irr.)	100—105
130,000	June 25	2	2	Do. 4 p.c. Deb. ...	100—105
53,220	Feb. 12	3	3	East Surrey, 6 p.c. Cum. Pref....	128—133
...	Aug. 19 '40	40/-	40/-	Eastbourne, 'B' 3½ p.c.... ..	97—102
117,425	March 1	—	£6	East Wight Cons. 5 p.c. ...	100—105
25,000	June 18	2½	2½	Guildford 4½ p.c. Red. Deb. ...	100—105
156,600	Feb. 19	50/-	50/-	Hampton C'ts, 5 p.c. Cons. Ord.	100 -105
18,000	May 28	—	£7	Malta & Med'n., 7 p.c. 1st Pref.	85—95
10,845	"	—	£7½	Do. 7½ p.c. 2nd Pref.	85—95
50,000	Feb 19	52/3	52/3	Mid. South. Util., 'A' Cons. 5 p.c.	107—112
70,380	June 25	2½	2½	Newport (Mon.), 5 p.c. Deb...	120—125
65,000	April 30	2½	2½	North Middlesex, 5 p.c. Pref....	112—117
70,000	March 12	2½	2½	Plymouth & Stone., 5 p.c. Deb.	124—129
76,501	June 18	2	2	Reading, 4 p.c. Perp. Deb. ...	98—103
74,777	April 3	2	2	Romford, 4 p.c. Debs. (Reg.) ...	98—103
21,000	June 11	2½	2½	Slough, 5 p.c. Perp. Deb. ...	122—127
211,740	" 18	2½	2½	Southampton, 5 p.c. Red. Deb.	105—110
363,575	July 2	2½	2½	Tottenham, 5 p.c. Reg. Red. Mt.	99—102
202,019	April 23	75/-	75/-	Tunbridge Wells, 4 p.c. Scale ...	140—145
135,257	June 11	2½	2½	Uxbridge &c., 5 p.c. Perp. Deb.	123—128

PROVINCIAL EXCHANGES

					Quotations July 20
804,948	March 5	2½	2½	Bath Cons.	114—116
122,577	Feb. 19	2½	4½	Blyth 5 p.c Ord.	124—126
1,667,250	July 16	2½	2½	Bristol, 5 p.c. max.	119½—120½
120,420	June 18	2	2	Do. 1st 4 p.c. Deb.	102—104
415,250	"	2	2	Do. 2nd 4 p.c. Deb. ...	101½—103½
328,790	"	2½	2½	Do. 5 p.c. Deb.	122—124
157,150	Feb. 12	3½	3½	Chester 5 p.c. Ord.	115—117
52,500	June 18	2	2	Do, 4 p.c. Cum. Pref. ...	99—101
40,000	"	2	2	Do. 4 p.c. Non. Cum. Pref.	99—101
36,430	"	1⅞	1⅞	Do. 3½ p.c. Deb.	88—92
41,890	"	2	2	Do. 4 p.c. Red. Deb. ...	103—102
542,270	Feb. 12	3	4½	Derby Cons.	135—140
55,000	June 18	2	2	Do. 4 p.c. Deb.	97—102
40,000	Feb. 19	5½	5½	Exeter 10 p.c.	185—195
10,000	"	5	5	Great Grimsby 'A' Ord. ...	175—185
6,500	"	5	5	Do. 'B' Ord. ...	175—185
79,000	"	5	5	Do. 'C' Ord. ...	165—175
732,000	Feb. 19	2	2	Hartlepool G. & W. Cn. & New	92—94
490,681	June 18	1⅞	1⅞	Liverpool 3½ p.c. Red. Deb. Stk.	95—100
245,500	"	2	2	Do. 4 p.c. Red. Deb. Stk.	102—103
306,083	Jan. 2	2	2	Do. 4 p.c. Deb.	103—105
680,000	June 4	2½	2½	Do. 5 p.c. Red. Stk. ...	104—109
20,000	"	2½	2½	Long Eaton 5 p.c. Pref.	9—11
80,000	"	2½	2½	Do. 5 p.c. Deb.	117—122
2,430,267	Feb. 12	6d.	6.9d.	Newcastle and Gateshead Con.	26/6—27/3a
682,856	"	2	2	Do. 4 p.c. Pref.	103—105
776,706	June 25	1⅞	1⅞	Do. 3½ p.c. Deb.	100½—102½
250,000	"	1⅞	1⅞	Do. 3½ p.c. Red. Deb. ...	96½—98½
73,186	April 23	2	2	Do. 4 p.c. Red. Deb. ...	102—104
206,280	Feb. 15	5	5	Preston 'A' 10 p.c.	185—190
188,219	"	3½	3½	Do. 'B' 7 p.c.	115—120
1,806,339	Feb. 25	3½	3½	Sheffield Cons.	151—153
95,000	July 2	2	2	Do. 4 p.c. Deb.	98—102
332,351	Feb 5	3	3	Sunderland 6 p.c. max. ...	121—123
192,150	" 12	2½	2½	Weston-super-Mare Cons. ...	113½—115½
64,338	July 2	2	2	Do. 4 p.c. Deb.	99—101
33,340	"	3⅜	3⅜	Do. 7½ p.c. Deb.	145—150

a—The quotation is per £1 of Stock. * Ex. div † For year. ‡ Paid free of income-tax.

60% Sulphur absorbed by our

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which has stood the test of 60 years.

Minimum Costs, Highest Efficiency

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GAS PURIFICATION & CHEMICAL COMPANY LIMITED

PALMERSTON HOUSE, 34, OLD BROAD STREET LONDON, E.C.2.

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Telephone: Mansion House 1156. Telegrams: "Balefire, London."

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GAS RETORTS In BEST STOURBRIDGE QUALITY also SILICIOUS QUALITY 81% SILICA

HIGH GRADE INSULATING QUALITY FIREBRICKS

REGENERATIVE TUBES & TILES

THE BRITISH GAS PURIFYING MATERIALS CO., LTD.

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NEW AND SPENT OXIDE

LONDON ROAD

Telegrams: "BRIPURIMAT" LEICESTER Telephone 59086.

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Porous and Light

Easy to Work

A War Time Economy of Labour

HARRISONS (LONDON) LTD.

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FIRTH BLAKELEY, SONS & CO., LTD. Vulcan Ironworks, Church Fenton, Yorks.

MANUFACTURERS of Gas-holders, Tanks, Condensers, Purifiers, Scrubbers, Washers, and every description of Gas Plant.

Sole Makers of the "P.M" semi-water Gas Plant.

Telegrams: "Blakeleys, Church Fenton."

Telephone: Barkston Ash 234 and 235 (Private Branch Exchange). Code: "Bentleys."

ROBERT DEMPSTER & SONS, LTD., ELLAND, Builders of CARBONIZING PLANTS, both Horizontal and Vertical. Manufacturers of CONDENSERS, PURIFIERS, GAS-HOLDERS, &c., also every description of COAL and COKE HANDLING PLANT. *Telegrams:* "Dempster, Elland." *Telephone:* Elland 2241, 2242 and 2243.

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70 & 72, Chancery Lane, London, W.C.2.

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WHY NOT BECOME AN INSPECTOR OF GAS METERS?

Write for particulars of specialized training for the qualifying examination of the Minister of Fuel and Power to the—

NALGO CORRESPONDENCE INSTITUTE,
24, Abingdon Street, Westminster, S.W. 1.

UNIVERSITY OF LEEDS

GAS RESEARCH FELLOWSHIP

APPLICATIONS are invited for the GAS RESEARCH FELLOWSHIP of the Institution of Gas Engineers tenable in the University of Leeds. The Fellowship, of the value of £325 for one year, but with the possibility of extension for a further year, will be awarded to a suitably qualified candidate for the prosecution of post-graduate research in Gas Chemistry.

Applications (on the prescribed form, which can be obtained from the Assistant Clerk to the Senate, the University, Leeds) must be submitted not later than August 25.

AUTHORITATIVE CORRESPONDENCE TRAINING

T.I.G.B. Students have gained 29 FIRST PLACES and Hundreds of Passes in the Examinations for A.M.Inst.C.E., A.M.I.Gas E., A.M.I.Chem.E., A.M.I.Mech.E., A.M.I.E.E., C. & G., etc.

Qualify Now by Home-Study with the T.I.G.B.

The Department of Fuel Technology covers **Gas Supply, Gas Engineering, Gas Power, Engineering,** and the **Certificates of The Institution of Gas Engineers.**

Write to-day for "Engineer's Guide to Success"—FREE—containing the world's widest choice of engineering courses—over 200—and which alone gives the Regulations as to admission to various examinations such as A.M.I.Gas E., A.M.Inst.C.E., A.M.I.Mech.E., A.M.I.Chem.E., C. & G., &c. The **T.I.G.B.** guarantees training until successful.

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Situations Wanted (prepaid), six lines and under (about 36 words), 4/6 per insertion. Each additional line (about six words), 9d.

Situations Vacant, Plant Wanted and for Sale, Contracts, Notices, &c., 1/- per line, with a minimum of 5/-. Box number charge, 6d.

To ensure insertion, copy for Classified Advertisements should be received on the Friday preceding publication date.

MISCELLANEOUS

LARGE quantities of good rough Breeze required by factors paying own Railway Tolls. Price and particulars to No. 9378, "GAS JOURNAL," 51, High Street, Esher, Surrey.

REPAIR WORK

CLOCKWORK Controllers for Public Lighting, Control and Time Switches, Clocks and all types of instruments and appliances operated by Clockwork. Repaired, Overhauled and Guaranteed. Inquiries welcomed. J. W. & R. E. Hughes (Clockwork Engineers), 58, Victoria Street, London, S.W. 1. ('Phone Victoria 0134.)

CONTRACTS OPEN

CITY OF SALFORD

(GAS DEPARTMENT)

REPLACEMENT OF CARBONIZING PLANT

TENDERS are invited for the supply, erection and setting to work of a 4,000,000 cubic feet per day CONTINUOUS VERTICAL RETORT INSTALLATION at the West Egerton Street Works.

Further particulars, specifications, drawings, and general conditions of contract may be obtained on application to the Gas Engineer (D. V. Lewis), Gas Offices, Bloom Street, Salford, 3, Lancs.

Sealed Tenders, endorsed "VERTICAL RETORT INSTALLATION," to be received by the undersigned not later than 10 a.m. on Monday, September 24, 1945.

The Corporation do not bind themselves to accept the lowest or any Tender and any contract entered into will be subject to the Standard Orders of the Corporation in so far as they are applicable.

Town Hall, Salford, 3. H. H. TOMSON, Town Clerk.

PLANT &c. FOR SALE & WANTED

'PHONE 98 STAINES.

FOR SALE.—Weir Feed Pump, 8½ in. by 6 in. by 13 in.; Spencer Hopwood Boiler, 10 ft. by 4 ft. 3 in., 90 lb.; Sectional Steel Tank, 16 ft. by 16 ft. by 4 ft.; Steel Tank, 26 ft. by 10 ft. by 8 ft.; Weir Service Pump, 7 in. by 7½ in. by 18 in.; 30 h.p. H.S. Enclosed Steam Engine; 10 h.p. Steam Turbine.

HARRY H. GARDAM & CO., LTD., STAINES.

FOR IMMEDIATE DISPOSAL *EX* STOCK

TWO 6 in. Keith Blackman GAS COMPRESSORS. 20,000 cu.ft. per min., 3 lb. pressure, belt driven,
ONE 42 in. Copper Cage Bottom Discharge SWAN NECK HYDRO, Lead lined.
One 48 in. Steel Cage Swan Neck Bottom DISCHARGE BELT or steam driven Hydro.
TWO 6 in. Steam Jacketed Belt driven DRUM PUMPS.
THREE 3 in., One 2 in., ONE 1½ in. DRUM PUMPS, geared by The Drum Engineering Co.
ONE Vertical Two Throw Vulcanite lined PUMP, 2 in. Plunger, 2½ in. Stroke, belt driven.
ONE Pearn DRY VACUUM PUMP Steam Driven, 10 in. by 8 in. by 8 in.
FULLEST DETAILS AND PRICES ON REQUEST.

TAYLOR WILSON & CO. (PLAISTOW), LIMITED,
Chemical Engineers & Machinery Merchants,
55 & 55a, Falcon Street, Whitwell Road,
Plaistow, E. 13.

APPOINTMENTS VACANT

None of the situations advertised in these columns relates to a man between the ages of 18 and 50 inclusive or a woman between the ages of 18 and 40 inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1945, or the vacancy is for employment excepted from the provisions of that Order.

SKEGNESS URBAN DISTRICT COUNCIL

APPOINTMENT OF SALES SUPERINTENDENT

THE Council wish to THANK applicants for the above appointment for their applications, and to inform them that the VACANCY HAS NOW BEEN FILLED.

(Classified Advertisements continued on p. 174)

APPOINTMENTS VACANT (ctd.)

TECHNICAL ASSISTANT required, having experience in the manufacture (Verticals) and distribution of Gas. Commencing Salary £340.

Apply, stating Age, Experience, etc., to G. P. MITCHELL, Managing Director, Worcester New Gas Light Company.

FITTINGS SUPERINTENDENT required. Small house available at low rental.

Apply, stating Age, Qualifications and Salary required, to G. P. MITCHELL, Managing Director, Worcester New Gas Light Company.
July 25, 1945.

CITY OF COVENTRY GAS DEPARTMENT

DRAUGHTSMAN

APPLICATIONS are invited for the position of DRAUGHTSMAN with the above Undertaking. The salary grade will be £260 rising to a maximum of £350 per annum by increments of £15, subject to satisfactory service (commencing salary in conformity with experience), plus cost of living bonus, at present £59 16s. per annum.

Applicants must have previous experience of gas plant design and structural work, also be capable of taking out quantities and preparing specifications.

The successful applicant will be required to pass satisfactorily a medical examination and to contribute on a statutory basis to the superannuation fund under the Superannuation Acts, as amended in regard to annuities to widows by the Coventry Corporation Act, 1936. He will also be required to contribute to the Staff Widows' and Orphans Pension Scheme.

Applications, stating Age, Experience, and Qualifications, together with position in relation to National Service Acts and Essential Works Order, and with *copies* of two recent Testimonials, should be received not later than August 9, 1945.

Gas Department Offices,
Hill Street, Coventry. Engineer and General Manager.

CITY OF COVENTRY

(GAS DEPARTMENT)

TECHNICAL ASSISTANT—DISTRIBUTION DEPARTMENT

APPLICATIONS are invited for the Position of TECHNICAL ASSISTANT in the Distribution Department of the above Undertaking. The salary grade will be £260 rising to a maximum of £350 per annum by increments of £15, subject to satisfactory service (commencing salary in conformity with experience), plus cost of living bonus, at present £59 16s. per annum.

Applicants must have a thorough technical knowledge and experience of high and low pressure distribution and to be competent draughtsmen capable of preparing drawings and estimates as required in the Distribution Department.

The successful applicant will be required to pass satisfactorily a medical examination and to contribute on a statutory basis to the superannuation fund under the Superannuation Acts, as amended in regard to annuities to widows by the Coventry Corporation Act, 1936. He will also be required to contribute to the Staff Widows', and Orphans' Pension Scheme.

Applications, stating Age, Experience, and Qualifications, together with position in relation to National Service Acts and Essential Works Order, and with *copies* of two recent Testimonials, should be received not later than August 9, 1945.

Gas Department Offices,
Hill Street, Coventry. Engineer and General Manager.

THE SHEFFIELD AND DISTRICT GAS COMPANY require the services of a DEPUTY SALES AND FITTINGS SUPERINTENDENT, at a commencing salary of £460 per annum inclusive of War Bonus. Co-Partnership and Superannuation Schemes are in operation.

Applicants should give full details of their experience and training, also age, and applications should be accompanied by *copies* of two recent Testimonials.

The successful candidate will be required to submit to a medical examination.

Position with regard to Essential Works Order and National Service should be stated.

Applications to be received by August 20, 1945, and should be addressed to: Ralph Halkett, Director and General Manager, The Sheffield and District Gas Company, Commercial Street, Sheffield, 1.

BOROUGH OF LOUGHBOROUGH

(GAS DEPARTMENT)

ASSISTANT ENGINEER

APPLICATIONS are invited for the Position of ASSISTANT ENGINEER to the above Undertaking, at a commencing salary of £325 per annum rising, subject to satisfactory service, by yearly increments of £15 to £370 per annum, plus cost of living bonus, which is at present £59 16s.

Candidates must be qualified Engineers, holding the Higher Grade Gas Engineering Certificate, and have a thorough knowledge of and experience in the control of Gas-Works plant, including Vertical Retort Installations (preferably Woodall-Duckham).

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating Age, Experience and Qualifications, together with information as to the position in relation to the National Service Acts and Essential Works Order, and *copies* of two recent Testimonials, must reach the undersigned not later than August 7, 1945. Envelopes should be endorsed "Assistant Gas Engineer."

Town Hall, Loughborough. A. GWYNNE DAVIES, Town Clerk.
July 18, 1945.

WANTED.—PUBLIC LIGHTING INSPECTOR to supervise maintenance, &c., of 2,200 Public Lamps. Wage according to qualifications.

Apply, stating Age, Experience, Wage required and position under Essential Works Order to Manager, East Hull Gas Company, St. Mark Street, Hull.

CITY OF BRADFORD

(GAS DEPARTMENT)

DRAUGHTSMAN and ENGINEERING ASSISTANT required. Commencing salary £345, rising to £375 per annum in accordance with Grade 8 of the Salaries and Grading Scheme plus present Cost of Living Bonus, which is £59 16s. per annum. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating position under National Service Acts and Essential Works (General Provisions) Order, and giving full particulars of Age, Training, Experience and Qualifications, with *copies* of three recent Testimonials, to be received by the undersigned not later than Wednesday, August 15, 1945.

Town Hall, Bradford. N. L. FLEMING, Town Clerk.
July, 1945.

CITY AND ROYAL BURGH OF EDINBURGH

(GAS DEPARTMENT)

ASSISTANT WORKS SUPERINTENDENT

Amended Advertisement

APPLICATIONS are invited for the Position of ASSISTANT WORKS SUPERINTENDENT at the Granton Gas-Works of the above Undertaking.

Candidates must have first class engineering qualifications with a sound training in modern gas-works practice, and must hold the Higher Certificate in Gas Engineering (Manufacture) or an equivalent educational qualification. They should also have considerable experience in the control of labour.

The remuneration will be £450, rising to £550 per annum with placing depending upon qualifications and experience, plus bonus (at present £60) and free house, fuel and light.

The appointment will be subject to the Corporation Superannuation Scheme.

Applications, stating Age, Experience and Qualifications and also the position in relation to the Essential Works Order, together with *copies* of recent Testimonials, should be lodged with the undersigned not later than the first post on Tuesday, August 14, 1945.

Previous candidates for this position will be considered and do not require to renew their applications.

15, Calton Hill, Edinburgh, 1. JAMES JAMIESON, Engineer and Manager.

SENIOR DRAUGHTSMAN required, experienced in design of Carbonizing Plant and Structural Work, also capable of taking out quantities and preparing specifications.

Reply, stating Age, Experience and Salary required, to F. C. Sugden & Co., Ltd., 10, East Parade, Leeds, 1.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY

ASSISTANT MANAGER—TAR AND BENZOLE WORKS

APPLICATIONS are invited for the above Position. Duties to include, under Works Manager, operation and upkeep of plant, control of labour, supervision of constructional work and allied duties. Applicants should state experience, chemical and chemical-engineering qualifications, age and present employment. References should be given.

Commencing Salary not less than £600 basic plus war bonus (at present about 12%) according to qualifications. Excellent prospects.

Apply, Chief Engineer, 30, Grainger Street, Newcastle-upon-Tyne, 1.

THE UXBRIDGE, MAIDENHEAD, WYCOMBE AND DISTRICT GAS COMPANY require:—

(1) An experienced WORKS MAINTENANCE FITTER, capable of carrying out repairs to steam engines, pumps, and other gas-works plant.
(2) A FITTER, preferably with experience of steam and water pipe fitting, and boiler repairs and maintenance.

The positions would be permanent to suitable men. Standard engineering rates are paid and co-partnership and Superannuation Schemes are in operation.

Apply in writing, stating Age and Experience, to Engineer and General Manager, Gas-Works, Cowley Mill Road, Uxbridge, Middlesex.

BOROUGH OF NELSON

(GAS DEPARTMENT)

DISTRIBUTION SUPERINTENDENT

APPLICATIONS are invited for the Position of DISTRIBUTION SUPERINTENDENT.

Candidates must have a thorough knowledge and sound practical experience of the distribution and sales of gas for both domestic and industrial purposes.

The salary will be £325 per annum plus war bonus (at present £59 16s. per annum), and will, subject to satisfactory service, be increased to £350 per annum plus war bonus at the end of the first year's service.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

The appointment will be terminable by one month's notice on either side.

Applications endorsed "Distribution Superintendent," stating Age, Qualifications and Experience, and accompanied by *copies* of three recent Testimonials, must be delivered to the undersigned not later than Tuesday August 14, 1945.

Town Hall, Nelson. F. W. ROBERTS, Town Clerk.
July 26, 1945.

DISTRIBUTION ENGINEER

APPLICATIONS are invited for the appointment of DISTRIBUTION ENGINEER.

Applicants must be experienced in all branches of Gas Utilization and Distribution and Workshop Practice, and have a thorough knowledge of high and low pressure supply. Applicants must have sound training and experience in the planning and estimating of distributing systems.

Applicants must be qualified Distribution Engineers possessing recognized technical qualifications. Preference will be given to Applicants possessing the Institution of Gas Engineers' Higher Grade Certificate (Gas Supply) or equivalent. The successful applicant will be required to pass a medical examination and to contribute to the Superannuation Funds under the Superannuation Acts.

Salary rising to £600 per annum plus War Bonus (at present £60), with placing on the Scale according to qualifications.

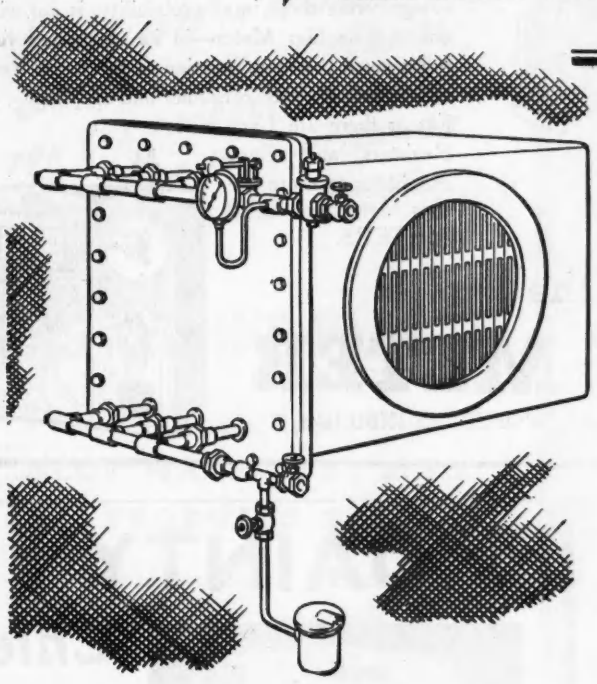
Applications, accompanied by recent Testimonials, stating Age, Qualifications and Experience, should be addressed to No. 9455, "GAS JOURNAL," 51, High Street, Esher, Surrey, and received not later than Saturday, August 18, 1945.

Get in on the Under Belly of RUST (Engineers' Enemy No.1)
Years of Wear instead of Weeks
GRANT & WEST LTD.,
'PHONE NORTH 2160
Steel Wires, Ropes & Cables running in and out of Water, Gas, Sulphurous Fumes, etc. will never RUST if treated with
ROPRES
IT KILLS RUST
STAYS on every STRAND.
RUST KILLS ROPES — but ROPRES rope preservative KILLS RUST.
Use ROPRES
Try a Tin on our Guarantee
3, Furlong Road, London, N.7.
'GRAMS: "SELEKJOINA, HOLWAY, LONDON"

FOUNDED 1850
HOLMES
HUDDERSFIELD

GAS HEATERS

★ ALL CAST IRON CONSTRUCTION



STANDARD TYPE

1 Cast Iron Casing

2 Cast Iron Heating Elements

3 Compact arrangement of elements to give high rate of heat transfer.

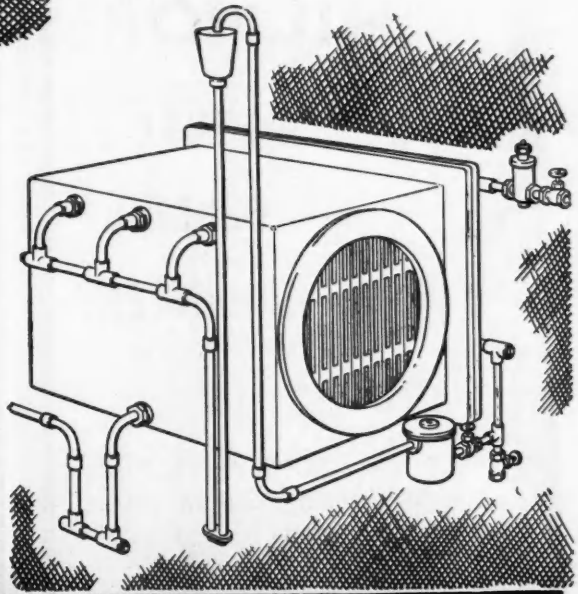
4 Elements readily accessible

5 Elements of standard construction. Spares always available

HUMIDIFYING TYPE

(Mitchell & Keillor design)

Embodying an arrangement for evaporating water from the steam trap into the gas to saturate it at the higher temperature obtained by using the heater. This device prevents drying out of theoxide in the purifier by unsaturated gas.



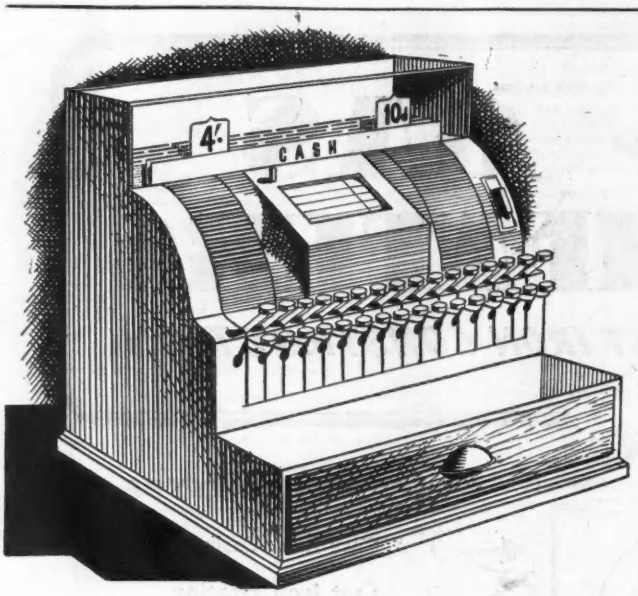
A large number of these heaters are in operation on gas works.

HEAD OFFICE • TURNBRIDGE • HUDDERSFIELD

LONDON OFFICE: 119 VICTORIA ST. S.W.1 • MIDLANDS OFFICE: 21 BENNETT'S HILL BIRMINGHAM 2

Telephones: Huddersfield, 5280 : LONDON, Victoria, 9971 : BIRMINGHAM, Midland, 6830

C245



PROTECTION..

THE CASH REGISTER, when it was first introduced as a replacement for the old-fashioned "Drawer Till," was frowned upon by the retail fraternity as "just another of them new-fangled contraptions." Quickly, however, the Cash Register won recognition and fame, and to-day, even the village corner shop, in all probability, is not without one. The Gas Meter—in its specialized field—fulfils much the same function as the Cash Register . . . it protects both consumer and supplier . . . but just as there are Cash Registers and *Cash Registers*, so there are Gas Meters and GAS METERS.

your *protection* is the

"A&M" METER

ALDER & MACKAY LTD., NEW GRANGE WORKS, EDINBURGH, 11

"HILMOR"

TUBE BENDING MACHINERY

This outfit is designed for the bending of lighter gauge tubing

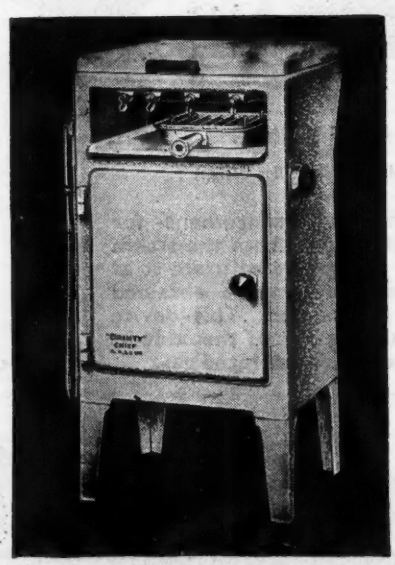
WE CAN SUPPLY MACHINES
- for bending Gas and Steam
- piping from $\frac{3}{8}$ in. to 2 in.
- in the cold state.

HILMOR LTD.

65, CALSHOT STREET, KING'S CROSS, LONDON, N.1.

Phone : Terminus 4714 (2 lines).

The DAINTY *Chief*



Streamlined modern design, cast iron construction and many other special features—notably economical consumption of gas.

R. RUSSELL & SONS LTD.

PEEL FOUNDRY, DERBY

Agents for Scotland and Northern Ireland :
JAMES R. THOMSON & CO., 10, Blythswood St., GLASGOW, C.2.

PGC

SPECIALISTS IN DESIGN AND CONSTRUCTION OF PLANTS FOR THE PRODUCTION, COOLING CLEANING AND PURIFICATION OF INDUSTRIAL GASES

GAS MAKING PLANTS

FOR DILUTION PURPOSES:

BLUE WATER GAS AND PRODUCER GAS

FOR PRIMARY SUPPLY & PEAK LOAD:

CARBURETTED WATER GAS

FOR OTHER APPLICATIONS:

HYDROGEN (By Steam-Iron or Catalytic Processes)

CARBON MONOXIDE

CARBON DIOXIDE

● *The Gas making Plants for using COKE (including both blue and carburetted water gas) supplied by us in the last 10 years alone have a nominal rated capacity of over 2,000,000 TONS of COKE ANNUALLY*

This excludes the very large number of installations since 1940 specially for emergency purposes

THE POWER-GAS CORPORATION LIMITED

STOCKTON-ON-TEES

ABP

SPECIALISTS IN DESIGN AND CONSTRUCTION OF PLANTS FOR THE GAS INDUSTRY

GAS WORKS PLANT

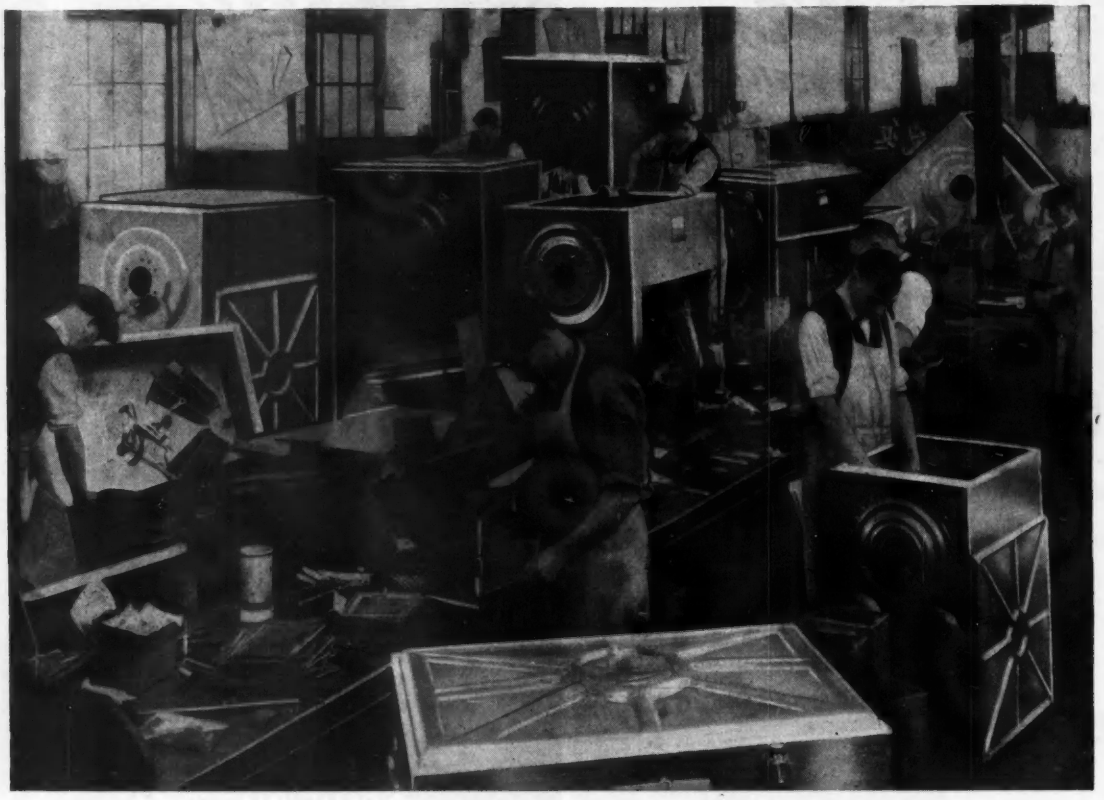
- GASHOLDERS
- CONDENSERS
- WASHERS
- PURIFIERS
- CARBURETTED WATER GAS PLANT
- BLUE WATER GAS PLANT
- PRODUCER GAS PLANT
- "MEEHANITE" IRON CASTINGS

Reconstructions Renewals and Repairs

ASHMORE, BENSON, PEASE & CO. LIMITED

STOCKTON-ON-TEES

A SECTION OF
WILLEY & Co's WORKS



SPECIALIZING IN

INDUSTRIAL METER CONSTRUCTION

Any Capacity Required

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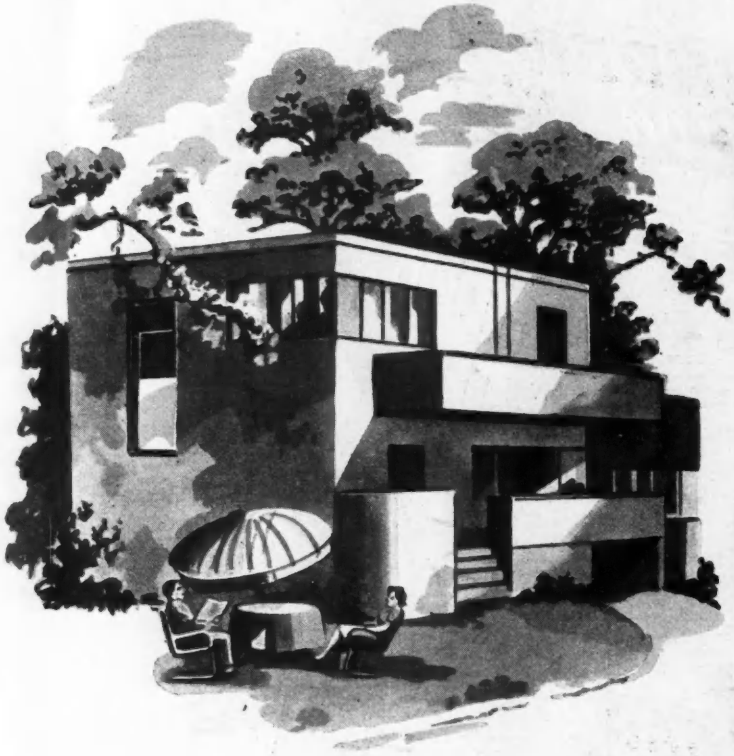

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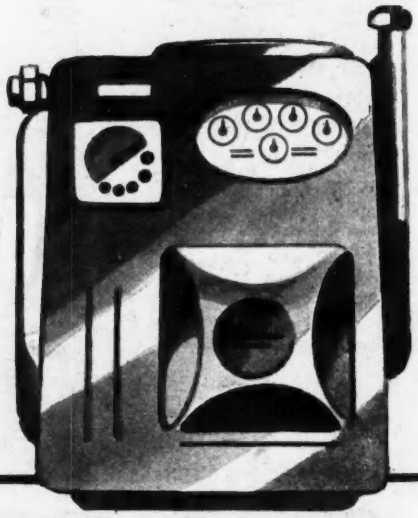

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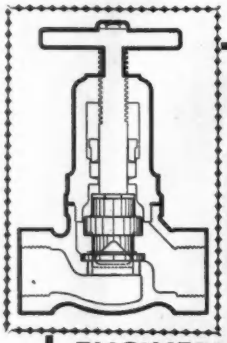

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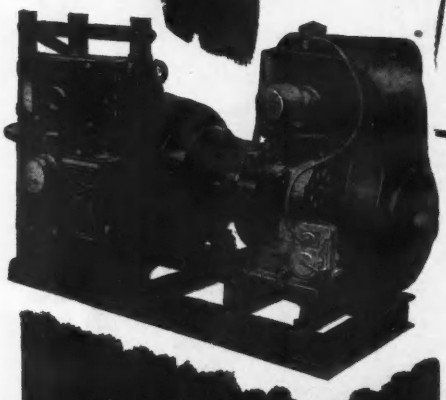

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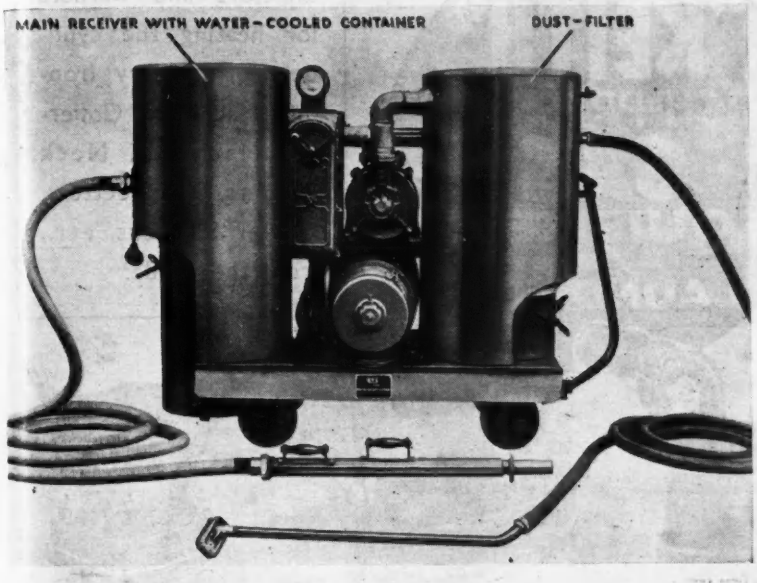

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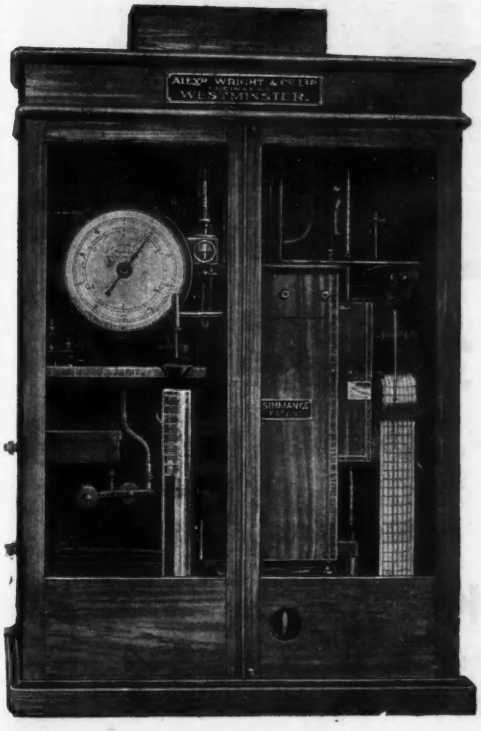

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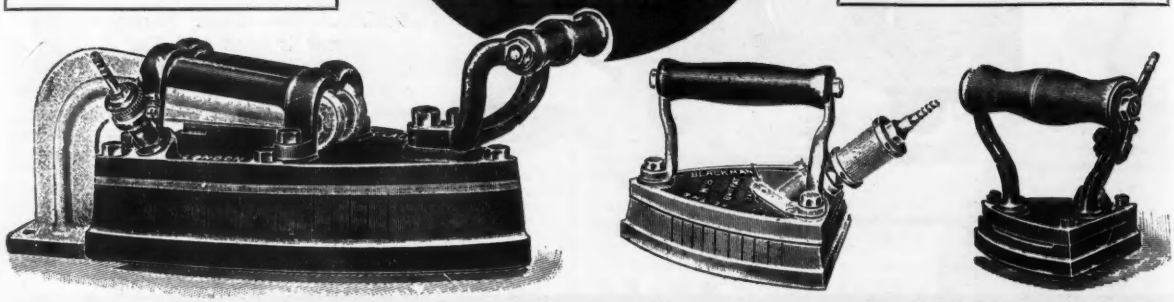

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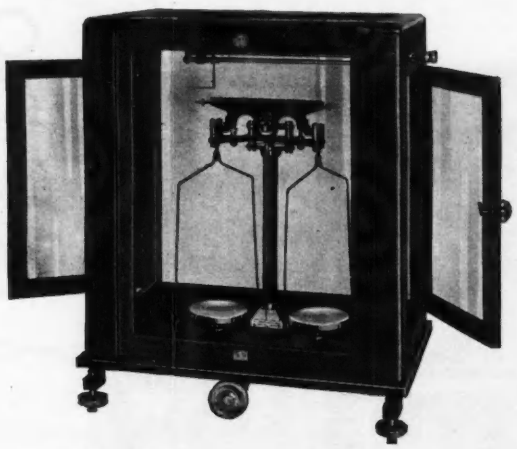

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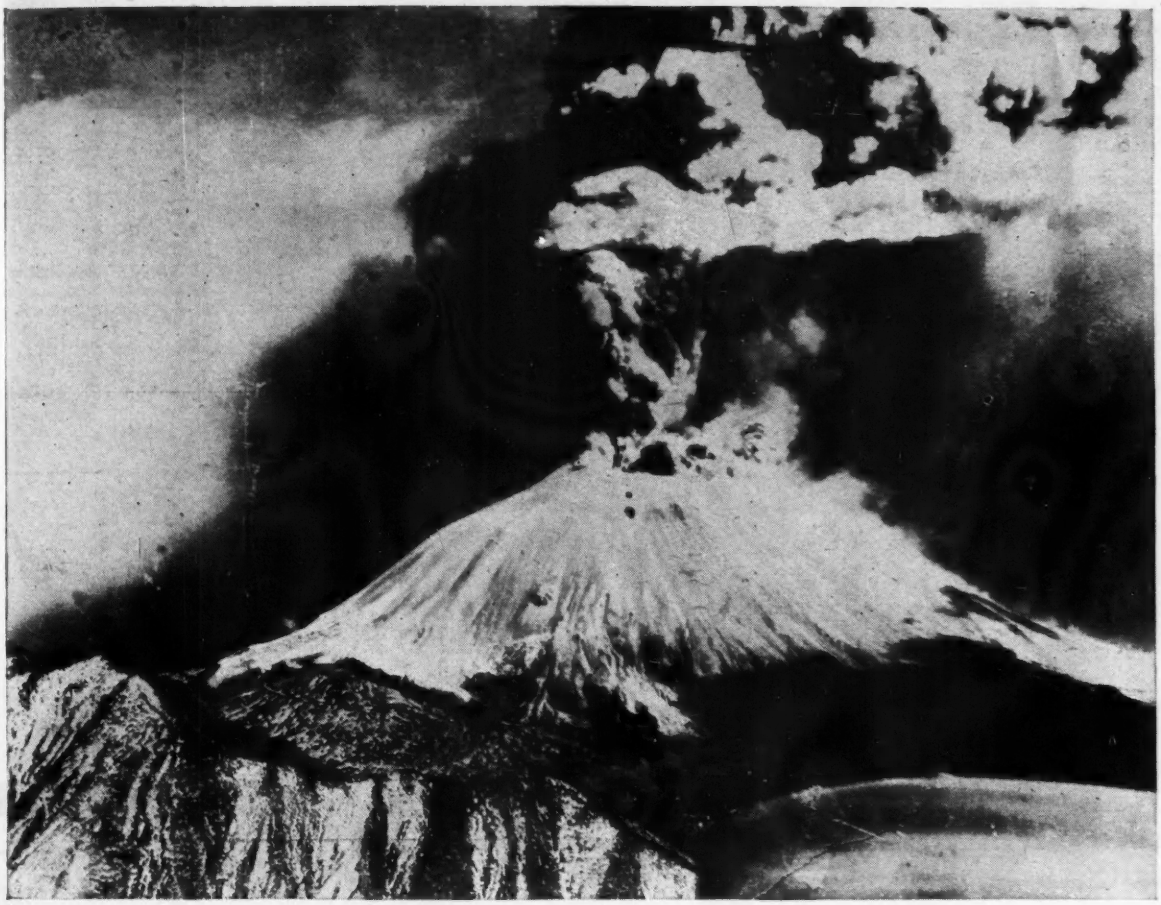

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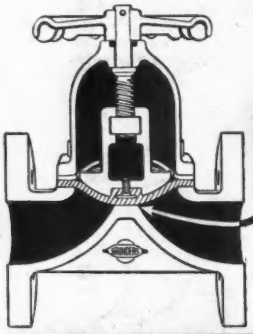

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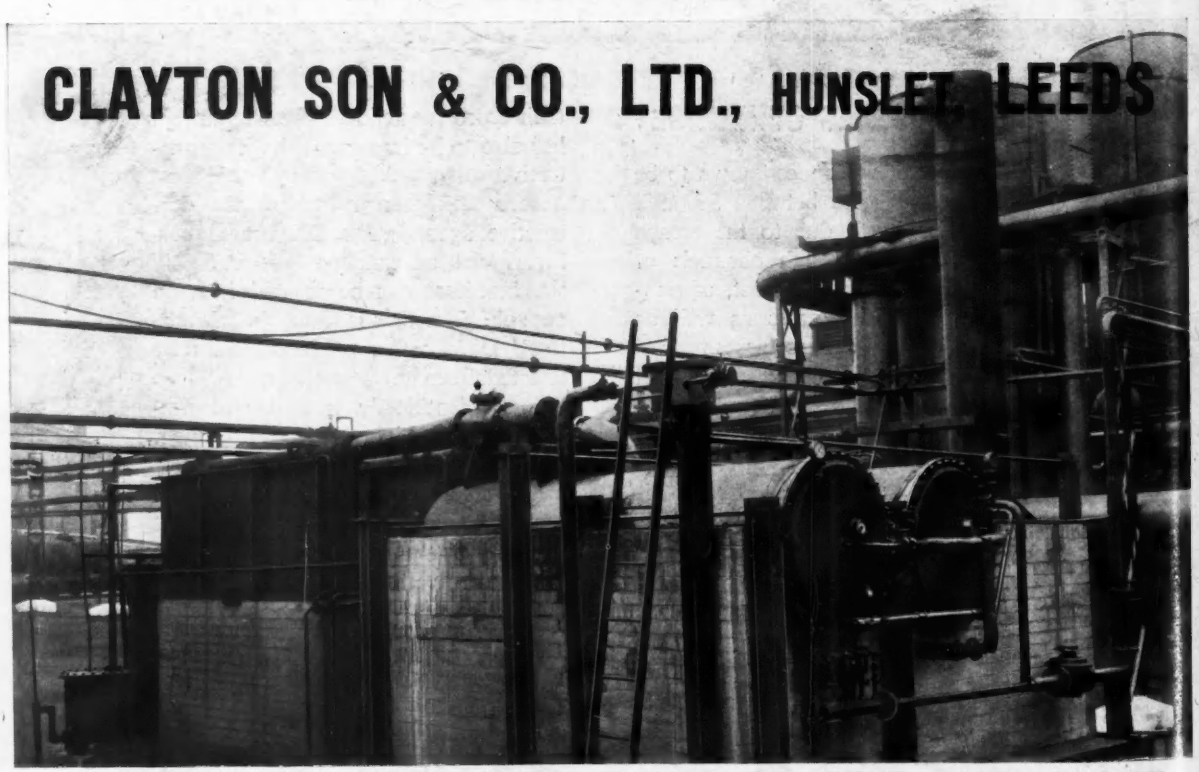

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